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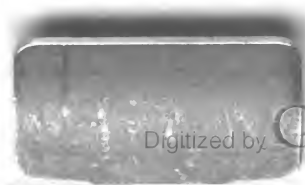
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VOLUME 4

THE

NUMBER 1

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

OCTOBER, 1904

\$100 A YEAR
10¢ A COPY



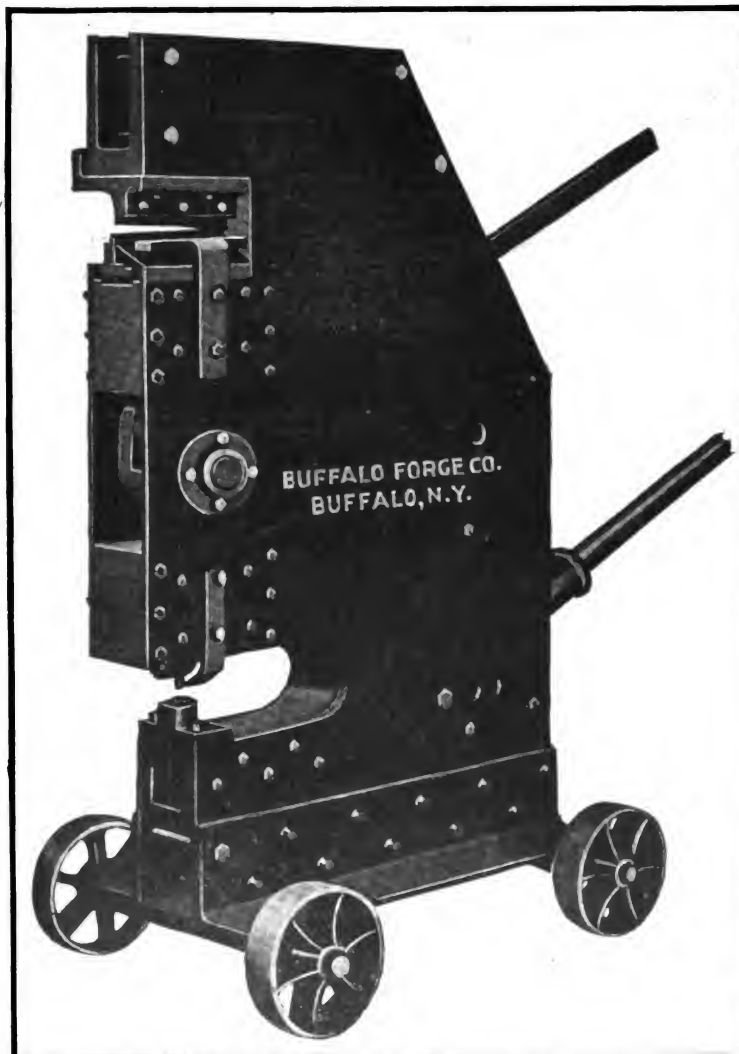
The New Buffalo Punches Shears and Cutters



Unbreakable - Built of Armor Plate - All Sizes and Styles
See New Circular

Here is a tool
designed and
built to stand the
test of time;
to do the hardest
work of a hand
machine contin-
uously. Ready
at all times for
its maximum
capacity.

It will not break
down. You will
never have a
more solid, honest
servant in the
shape of a tool
in your shop.



No shop is com-
plete without this
tool. We build
a full line of
sizes and styles
for every require-
ment. Each is
up to date.

They work easy,
require no atten-
tion to keep in
repair.

The saving in
your time will
cover the cost
in a short time.

The prices
are low.

BUFFALO PUNCH, SHEAR AND CUTTER

New Circular and Photos on Application

BUFFALO FORGE COMPANY

BUFFALO, N. Y., U. S. A.



CARRIAGE MAKER and BLACKSMITH TOOLS

THE "ELITE" BLOWER

is correctly manufactured and is designed to meet the demands of hard service, together with the greatest possible efficiency, durability and convenience.

IT'S A
MONEY
MAKER.



Fig. 900, 12 inch.

Manufactured by

THE
SILVER MFG. CO.

365 BROADWAY
SALEM, OHIO
U. S. A.

Hub Boxing Machines, Spoke Tenon Machines, Band Saws, sizes 20, 26, 32 and 36 inch, Forges, and a complete line of hand and light Power Drills, a 19-inch Post Drill and a 20-inch Round or Square Base Drill with Lever or Screw Feed. The last two drills are used extensively by Carriage Builders and others.

THESE ARTICLES
ARE
GUARANTEED
AS
REPRESENTED.

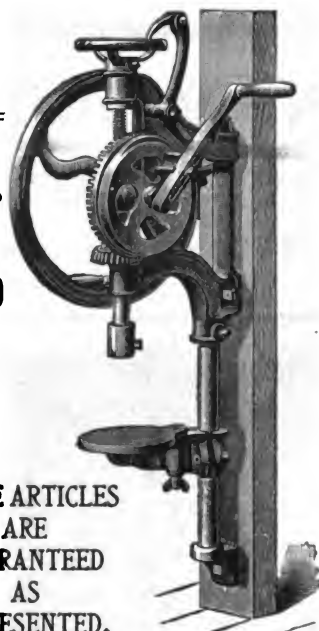


Fig. 731, No. 1.

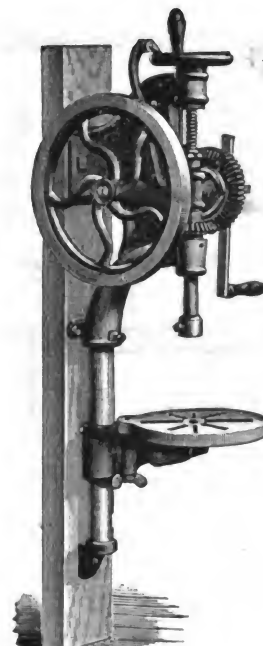


Fig. 742, No. 12.

Special prices are extended to Carriage Makers and Smiths if this paper is mentioned.

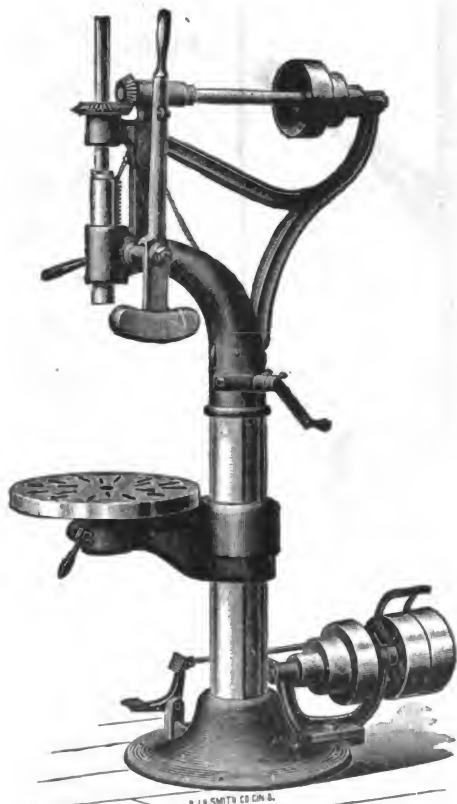


Fig. 850, 20 inch.

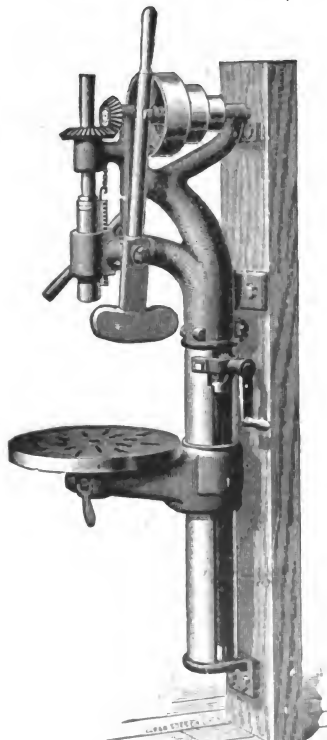


Fig. 727, 19 inch.

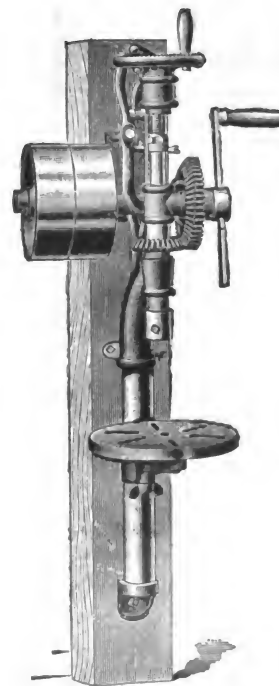


Fig. 746, No. 12.

DO YOU WANT TO WIN?

It's up to You. You can, if you will, WIN one of the PRIZES IN OUR GREAT PRIZE OFFER

To the Customer whose purchases total the greatest, in Dollars and Cents, from September 1st, 1904, to April 15th, 1905, WE ARE GOING TO GIVE, ABSOLUTELY FREE, AN AUTOMOBILE VALUED AT \$800.00.

To the Customer whose purchases are second in amount during this period WE SHALL GIVE, ABSOLUTELY FREE, A 2½-h.p. WEBER GAS OR GASOLINE ENGINE, VALUED AT \$125.00.

To the Customer whose purchases are THIRD in amount, during this period, we shall give, absolutely free, a CASH prize of \$50.00.

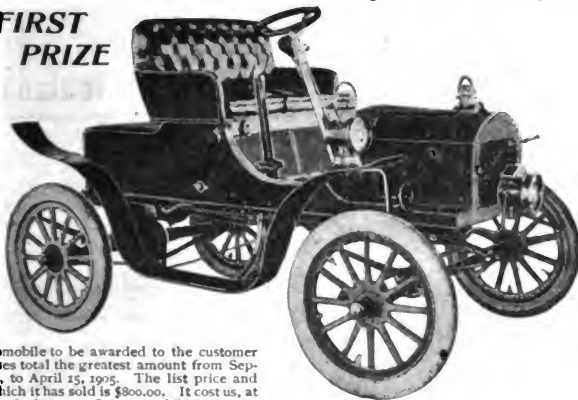
To the Customer whose purchases are FOURTH in amount, during this period, we shall give, absolutely free, a CASH prize of \$25.00.

To the Customer whose purchases are FIFTH in amount, during this period, we shall give, absolutely free, a CASH prize of \$15.00.

A Grand Total of \$1,015.00 TO BE GIVEN AWAY

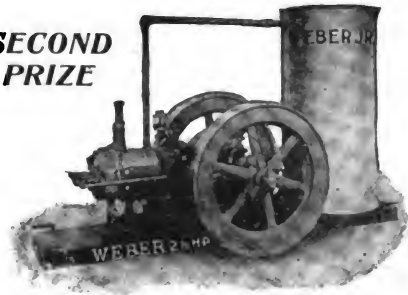
Refer to the September AMERICAN BLACKSMITH for full particulars, or, better yet, write direct to us and we will tell you all about it. This is without doubt the **greatest offer** you ever had, so don't fail to write us at once for we will tell you how to win. No scheme or lottery, but a straightforward contest. You get **full value** received for every cent you send us.

FIRST PRIZE



This automobile to be awarded to the customer whose purchases total the greatest amount from September 1, 1904, to April 15, 1905. The list price and the price at which it has sold is \$800.00. It cost us, at wholesale, exactly \$600.00. It is on exhibition at our store and is open for inspection to any one who may desire to see it. It has the latest French-style body, four full elliptic springs, long wheel base, 3-in. Diamond tires, adjustable wheel post, 7 h. p. engine, a sliding gear transmission, something no other runabout can boast of; artillery style of wheels, gasoline capacity for 125 miles, water capacity for 500 miles, the cost of running one quarter of a cent a mile. This machine is manufactured by members of the Association of Licensed Automobile Manufacturers, and has been exhibited and is represented in the leading cities in this country. When you think that your chance of winning this is equal to anyone, doesn't this appeal to you as a fine offer? We want you to take advantage of it and get in line at the very start. We have circulars complete in their description of this machine, and shall be glad to mail them to anyone upon request.

SECOND PRIZE



This 2-2½ h. p. Weber engine to be awarded to the man whose purchases are second greatest in amount from September 1, 1904, to April 15, 1905. This engine is well and favorably known and represents without question the best gas or gasoline engine on the market to-day. The space here is too limited to give an extended description, but descriptive circulars will be cheerfully sent to any address upon request. If you don't win the automobile, there is a very good chance for you to win this engine. No one knows what your purchases amount to, you don't know what the other man is buying, so send on your orders and don't forget to secure the advantage of an early start.

EXAMPLES OF OUR ECONOMICAL PRICES

AXLES AWAY DOWN

We are offering you axles at prices which will surely enable you to save money. The prices below you will recognize as extremely low, but they represent only part of the interest. In prices on our new revised sheet, which became effective September 1st. We carry all sizes and all kinds of axles at prices correspondingly low with those shown here.

ORDER NOW AND SEND FOR CATALOGUE.



Half Patent, Double Collar.

No. 12. Short Bed.		No. 11. Long Bed, Square or Fastall.	
¾.....	\$1.13 per set.	¾.....	\$1.38 per set.
¾.....	1.13 "	¾.....	1.38 "
¾.....	1.13 "	¾.....	1.38 "
1.....	1.25 "	1.....	1.50 "
1½.....	1.31 "	1½.....	1.63 "
1½.....	1.44 "	1½.....	1.75 "
1½.....	1.75 "	1½.....	2.13 "
1½.....	2.38 "	1½.....	3.00 "
1½.....	3.13 "	1½.....	3.75 "

Boxes are included with all axles.

A HORSE-SHOE BARGAIN

GET READY FOR WINTER



For a short time only we offer you bargain figures on the well-known Phoenix horseshoes, acknowledged to be the best made. At the extremely low prices we offer, you can well afford to anticipate your wants and stock up on shoes. Nothing will add so greatly toward winning one of these prizes.

IRON OR SNOW SHOES. EXTRA LIGHT STEEL SHOES.
20 Kegs or more, \$3.50 per keg...\$3.65 per keg.
10 Kegs or more, 4.00 " " ... 3.75 " "
Less than 10 kegs, 4.10 " " ... 3.85 " "

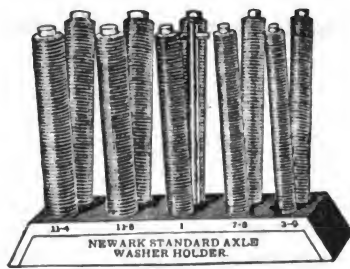
Can also quote interesting prices on direct factory shipments. Write for prices. Large and complete assortments of all sizes on hand. Consult our catalogue for other styles we carry.

Our Spring 1904 catalogue, together with the new revised sheet with reduced prices, are here at your disposal. If you fail to have a copy write us at once. They will teach you how to save money on all your purchases, for we carry a complete line of tools and materials for the blacksmith or wagon-maker. Prices always the lowest; goods the best.

AN EARLY START TOWARD WINNING A PRIZE IS IMPORTANT. YOU BETTER GET STARTED RIGHT AWAY. PROMPT SHIPMENTS PROMISED.

CRAY BROTHERS, Cleveland, O.

DEPARTMENT C



SOLID LEATHER AXLE WASHERS.

OUR PATENT AXLE WASHER HOLDER Combines CONVENIENCE, ECONOMY AND DURABILITY. Holds 500 Newark Standard Axle Washers. Every wagon and carriage manufacturer wants one. Handiest thing around the factory.

The "Standard" and "I.X.L." brand of Solid Sole Leather Axle Washers are our specialty. Send for descriptive catalogue No. 8. We make washers for every axle on the market.

Write now for prices and FREE SAMPLE of our washers. Mention this paper.

THE NEWARK LEATHER WASHER MFG. CO., NEWARK NEW JERSEY

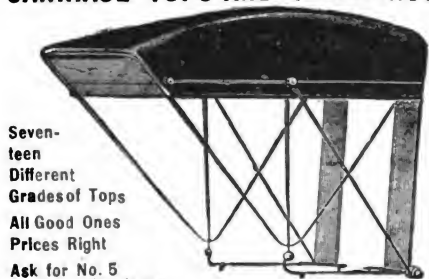


"QUICK ACTION" IGNITING DYNAMOS EXCEL ALL OTHERS!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

The Miller-Knoblock Electric Mfg. Co.
SOUTH BEND, IND.

A COMPLETE LINE OF CARRIAGE TOPS AND TRIMMINGS



Seven-
teen
Different
Grades of Tops
All Good Ones
Prices Right

Ask for No. 5
Catalogue

C. A. HALLIDAY, 24 CEDAR STREET, ONEIDA, N. Y.

The VICTOR Buffer

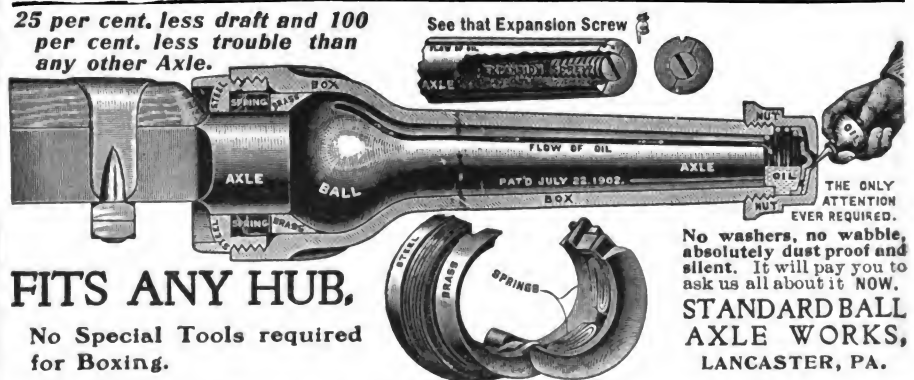
FOR USE ON
EITHER PLATFORM
OR ELLIPTIC
SPRINGS.



Quickly Attached by
Anyone without the
Use of Bolts or
Straps.

Indianapolis Bolster Spring Company, Indianapolis, Ind.

25 per cent. less draft and 100
per cent. less trouble than
any other Axle.

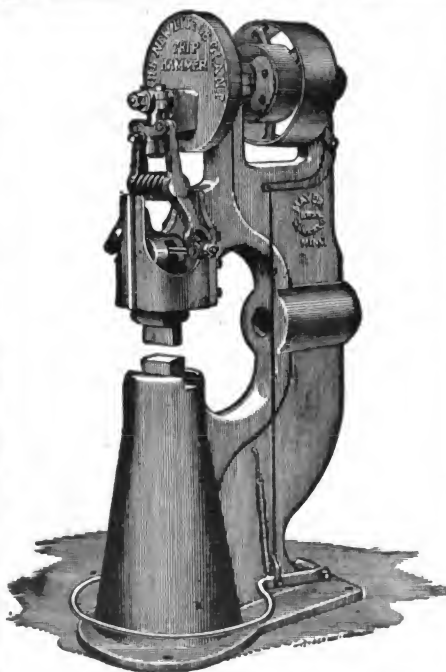


FITS ANY HUB,

No Special Tools required
for Boxing.

See that Expansion Screw

No washers, no wobble,
absolutely dust proof and
silent. It will pay you to
ask us all about it NOW.
**STANDARD BALL
AXLE WORKS,
LANCASTER, PA.**



THE NEW LITTLE GIANT
U. S. PATENT, JANUARY 1, 1901
CANADA PATENT, AUGUST 20, 1901

700 NOW IN USE

TRIP HAMMERS

NOW IS THE TIME TO BUY

A TRIP-HAMMER

Is the Blacksmith's

BEST HELPER

And Will Pay for Itself

IN ONE YEAR



THE EASY
PATENT APPLIED FOR

50 NOW SOLD

For Prices and Information

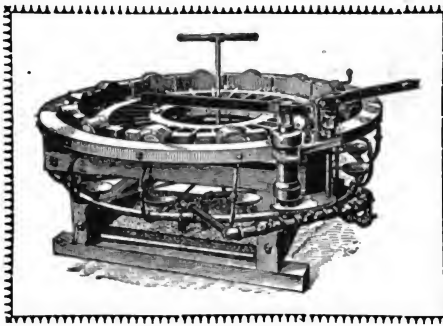
Write to

**MAYER BROS.
MANKATO
MINN.**

MENTION
THE AMERICAN
BLACKSMITH

COLD TIRE SETTING IS A GREAT SUCCESS

There can be no question about that, as it is proved thousands of times every day, but it does not follow that ALL METHODS of cold tire setting are successful. In order to get good results you must have a carefully built machine, em-



ploying the right principles, and any other is a disappointment and dear at any price. We have been making tire setters a good many years and can furnish you with a machine which will do the work RIGHT.

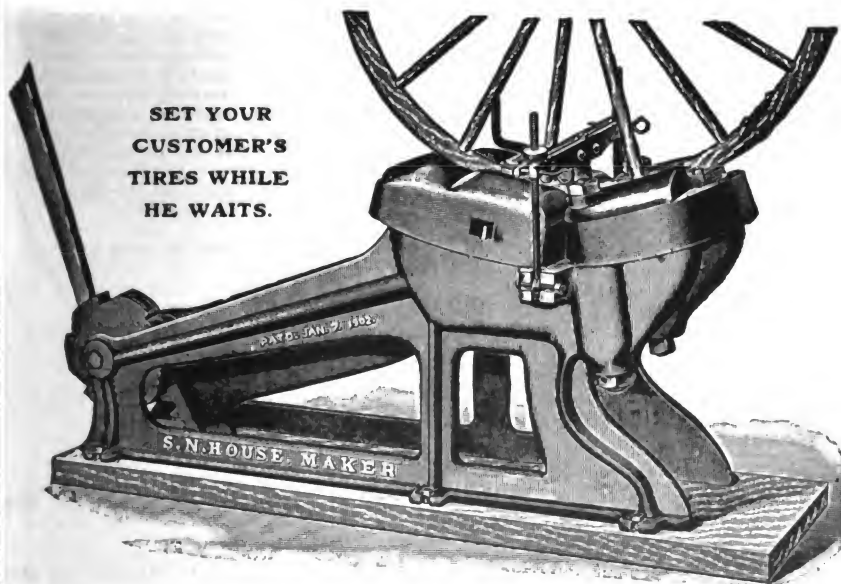
Results are More Important than Price

For full description of machines, write us, stating requirements.

The West Tire Setter Company

Rochester, New York

The House Cold Tire Setter



SET YOUR
CUSTOMER'S
TIRES WHILE
HE WAITS.

Is On Exhibition

at the World's Fair, located in the Transportation Building, middle door, western entrance, where exhibitions are given of its

Wonderful Work

and which you are most cordially invited to witness and see for yourself that it is

The Most Valuable Tool Ever Invented For a Blacksmith

Manufactured by

S. N. HOUSE

THIRD and CLARK AVE.

St. Louis, Mo., U.S.A.

Macgowan & Finigan Foundry and Machine Co.

Selling Agents

41, 42 and 43 Gay Building - - - St. Louis, Mo.

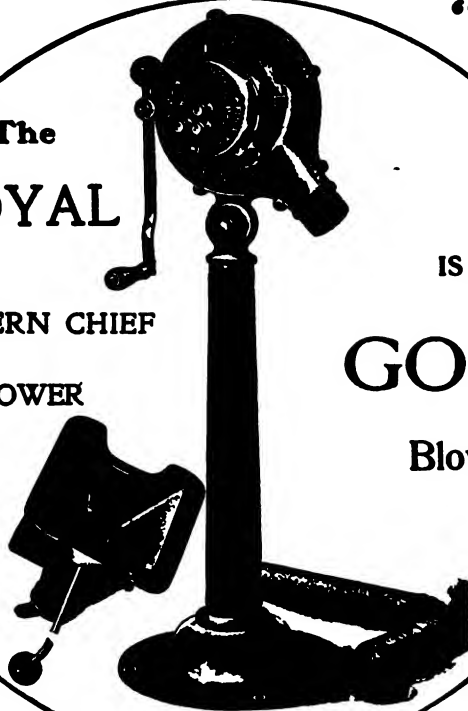
Arkansas, Colorado, Illinois, Indian Territory, Indiana, Iowa, Kansas, Kentucky, Missouri, Oklahoma and Tennessee.

THREE GOOD THINGS

"ASK THE DEALER."

The
ROYAL
WESTERN CHIEF
BLOWER

IS A
GOOD
Blower



ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.
Gears and Boxes are phosphor bronze and steel.
No spiral or worm gears.
Fan, 12 inches. Weight, 100 lbs.
Fire pot measures $9 \times 11\frac{1}{2} \times 4$ in. inside.

No. 14 Drill

This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.

THE
WESTERN CHIEF
DRILL
No. 14
Is a Good Drill



It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table.

Drills to center of 21-inch Circle.
Bores from 0 to $1\frac{1}{2}$ inches.
Takes Bits $\frac{1}{4}$ or $\frac{1}{2}$ Shank.

Weight, 215 pounds.



The
Royal
No 100
Forge
Is a
Good
Forge

Hearth, $33\frac{1}{2} \times 46$ inches.
Fan, 12 inches.
Height, 30 inches.
Weight, 275 pounds.
Length over all, 64 inches.

No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

"We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

Sold by all Jobbers



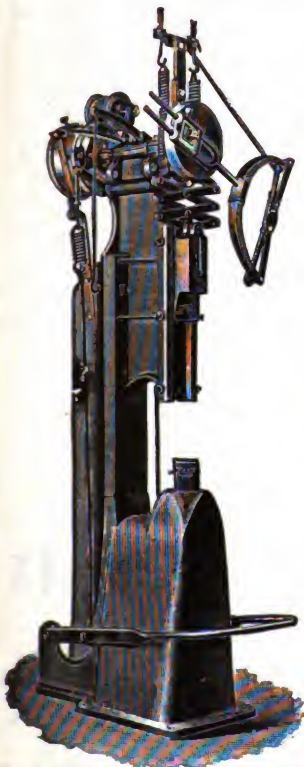
**STAR
MFG
C O**

CARPENTERSVILLE, ILL.

PAT. DEC. 4, '94
DEC. 31, '01

Every Article Guaranteed

The J. D. Hammer



Built especially for carriage and repair shops.

A Foot and Power Hammer Combined

AS A POWER HAMMER

All heavy work, such as welding stubs, heavy machine work and sharpening plows can be done on this hammer. Iron $3\frac{3}{4}$ inches square may be cut, or you can upset an iron 10 inches long, as hammer strikes the same blow 10 inches above the anvil as it does on the anvil. Strikes about 300 blows per minute.

AS A FOOT HAMMER

This hammer, may be instantly and easily changed from belt to foot power. For welding, rounding, flattening, swaging, cutting iron or any place you can use a helper, this hammer is always ready. It will strike as hard a blow with foot power as it will with the belt, only not quite as fast.

DO NOT BUY A HAMMER

that you can't get a stroke out of without starting an engine. The J. B. is the best all around hammer. None better for plow work. Twenty inches between dies when hammer is at highest point.

Any tools that are used on anvil can be used with this hammer. Shipping weight 1400 lbs.

Write for prices and full description.

Jinks & Davis
Morrill, Kansas

NEW PUTNAM [®] HORSE SHOE NAILS

⌘ REGULAR AND CITY HEADS ⌘

"They will hold the shoe till you want to take it off"



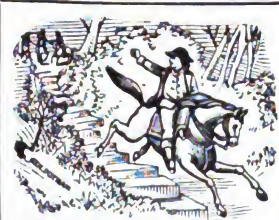
The New Putnam process of rolling down on all four sides gives a true point, preserves strength of metal and insures perfect driving.

These nails have stood the test of fly time and sharpening, and that under the hardest conditions, and are fully warranted.

Greatest In Tensile Strength

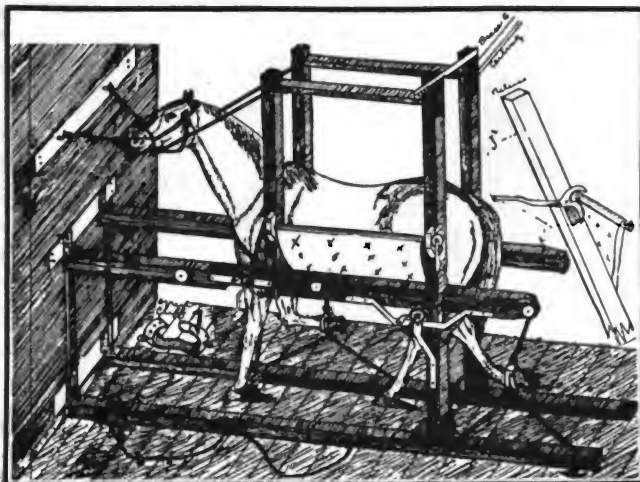
Samples Free

Beware of imitations and the efforts of competitors to palm off inferior nails by the use of the word PUTNAM.



Putnam Still Leads

PUTNAM NAIL CO.
NEPONSET, BOSTON, MASS.



HEMPHILL'S New Horse Shoeing Stocks

The best shoeing stocks made. Perfect in all respects. Handles horses or mules from the smallest to largest without any changes to be made, no strain on the building, quickest to operate. Horses can be fastened in stocks inside of four minutes and released in one minute. This machine is neatly and strongly made. Handles two feet at a time and has automatic felt-lined cuffs. Turns either way to wall. Many other valuable improvements that no others have. Satisfaction guaranteed. Price right. Write me for descriptive circular.

M. L. HEMPHILL *Rensselaer, Ind.*

ASK YOUR DEALER TO SHOW
YOU THE

ANVIL

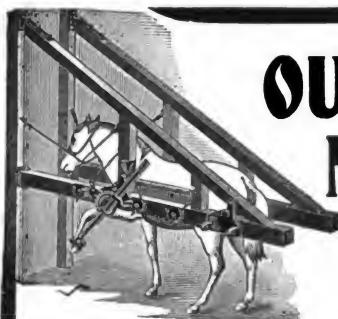
THAT

"Rings Like a Bell"

Manufactured by
The Columbus Forge & Iron Co.,
COLUMBUS, OHIO.

HERMANN BOKER & CO.,
SOLE SALE AGENTS,

101 Duane St., New York City.



OUR RECENT NEW MOVE

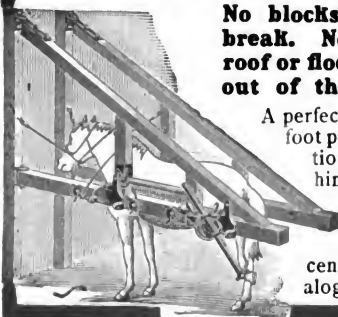
into larger and finer quarters at Wabash was made necessary by an increasing demand for Barcus Stocks from all parts of the world. The demand is due simply to the fact that it is a practical machine, built for every-day use by practical shoers.

Geo. Barcus & Company
Wabash, Ind., U. S. A.

Canadian Horse Stock Co., Hamilton, Ontario, Canada

BARCUS HORSE STOCKS THE MOST EASILY OPERATED

No blocks and tackle to tangle and break. No cumbersome bracing to roof or floor. The frames swing back out of the way when not in use.



A perfect, automatic device to hold the foot perfectly solid in any desired position. Leg arm can be changed from hind to fore foot, either side, in thirty seconds. The Barcus Stocks, always the best, have been made better than ever by many recent improvements. Send for catalogue—FREE.

AN AXLE



We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

If you wish further particulars
Write to the

DALZELL AXLE CO.,

South Egremont, Mass.

Which is coming into favor
again is here illustrated, the

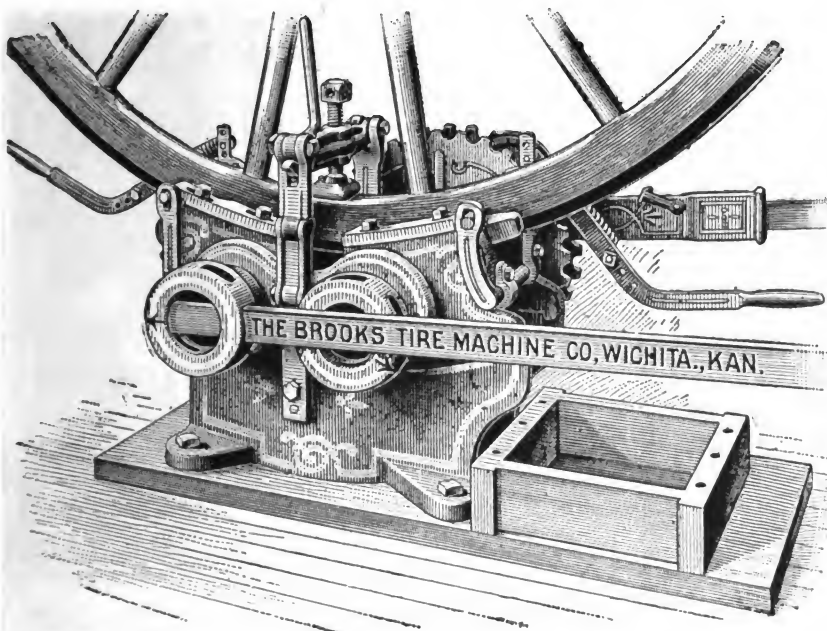
Stivers
Long Swell

THEY SEE THE POINT

The thousands of visitors to our 'World's Fair Exhibit see not one, but many points of superiority in the

Brooks Cold Tire Setter

We demonstrate daily the advantages of The Brooks and can convince the most skeptical that we have a machine that is practical and durable and which will set tires cold rapidly and accurately.



You'll miss a good thing if you pass us by. We are located at the West end of Transportation Building, just inside the South Arch entrance.

Send for circulars and prices and receive FREE a fine pocket map of the World's Fair grounds.

The Brooks Tire Machine Co.

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DEATH TO HEAVES
Guaranteed

Newton's Heave, Cough, Distemper and Indigestion Cure. A veterinary specific for wind, throat and stomach troubles. Strong recommendations. \$1 per can. Dealers, mail or Ex. paid. Newton Horse Remedy Co. (3) Toledo, Ohio.

FOR SALE

- 1 No. 2 Garvin Sprocket Miller or Lincoln Miller.
- 1 8-horsepower Porter, Horizontal Steam Engine.
- 1 Merrill Drop Hammer, 400 lbs.; also one 500 lbs.
- 2 Bradley Strap Hammers, 15 lbs.
- 1 Buffalo Forge Co. Blower, inlet 34 inches, outlet 26 inches square.

CORTLAND CARRIAGE GOODS CO.,
CORTLAND, N. Y.

ESTABLISHED 1836

BEALS & CO. Iron, Steel and Hardware

Tools and Supplies for Horseshoors
and General Blacksmiths
Carriage Hardware and Woodwork

44, 46, 48 & 50 TERRACE, BUFFALO, N. Y.

WHAT? YES!

No. 15 THE BADGER No. 15

Will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{1}{2}$ " by $\frac{1}{2}$ " flat iron.
Will shear $\frac{1}{2}$ " by $\frac{1}{2}$ " band iron.
Will shear 1" round bars.



Weights 800 Lbs.

CAN YOU BE WITHOUT ONE?

Write for Catalogue and prices.

ROCK RIVER MACHINE CO.

JANESVILLE, WIS., U. S. A.



FOOT POWER HAMMER

THE C. E. SUTTON COMPANY

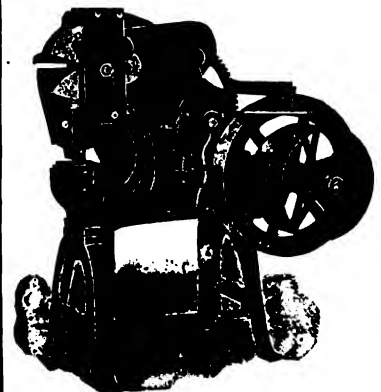
TOLEDO, OHIO, - - - U. S. A.

We build anything you want in the machine tool line.

The Most Reliable Tools on the Market

Best material and workmanship.

Write for bulletins.



BLACKSMITH PUNCH

Why Spend Good Money

for a new anvil, when we can fix up your old one "good as new"?

LOOK AT THIS

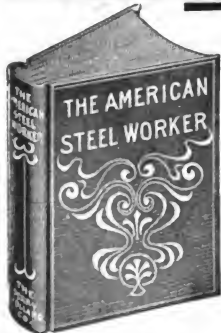
THEN AT THIS



We are experts at repairing old wrought anvils.

WRITE FOR PRICES

Columbus Anvil and Forging Co.
Frankfort St., COLUMBUS, OHIO



"BEST BOOK I EVER SAW"

Writes a blacksmith. Lots of others say so, too. Markham has been hardening steel for 27 years and studying it all the time. He tells in plain English just how to handle each case. Shows the best methods; but if you can't get them, it tells you how to do good work with what you have.

You can build a first class furnace if you want to from his plans and use any fuel you like.

Don't think you've got this information in other books—you haven't. It isn't there. Other books may read nicely and sound well, but none of the authors has had Markham's experience, and that's what counts.

343 pages, \$2.50.

Money back if not satisfied, or sent on approval.

AMERICAN BLACKSMITH COMPANY,
P. O. Drawer 974. BUFFALO, N. Y.

MODERN POWER HAMMER

FOR

BLACKSMITHS AND
IRON WORKERS

Used Daily Cures That
"TIRED FEELING."

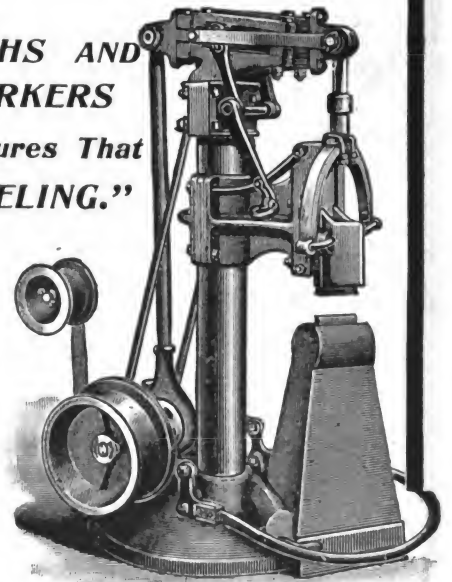
Height, 5 Feet.
Floor Space, 30x40
Inches.
Weight, 1200 Lbs.

Length of stroke changed instantly while running. The only hammer made that will strike a very light blow at full speed. All others slow down to get a light blow.

The "Modern" gives you any blow you want at any speed; hand lever controls the force of blow, foot treadle controls the speed.

Long planed guides adjustable for wear. Cast steel hammer adjustable up and down to suit thickness of stock. Tool steel dies.

Greater range of work than any other hammer.

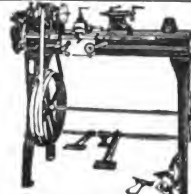


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GRINNELL MFG. CO.,

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SUCCESSORS TO THE KOCH MFG. CO.



LATHES

First-class Tools at reasonable prices. We build foot and power lathes from 9 in. to 15 in. Sensitive drills, emery grinders and wood lathes. Write for complete catalog. We guarantee to interest you.

THE CARROLL-JAMIESON
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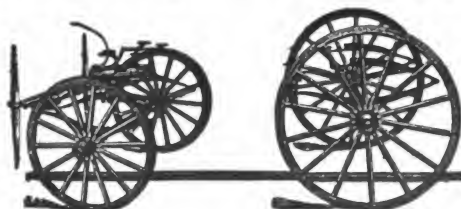


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BUOB & SCHEU, Estab. 500-520 EAST COURT ST.
1883 CINCINNATI, OHIO.

GEARS IN THE WHITE

Catalogue
A



1,000 Styles
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Letter Company

73 W. Eagle St., Buffalo, N. Y.

Ever Send Out circular letters to the TRADE? Our imitation typewritten letters absolutely cannot be distinguished from the real. They are the kind that get attention, that bring results. Send for free samples.

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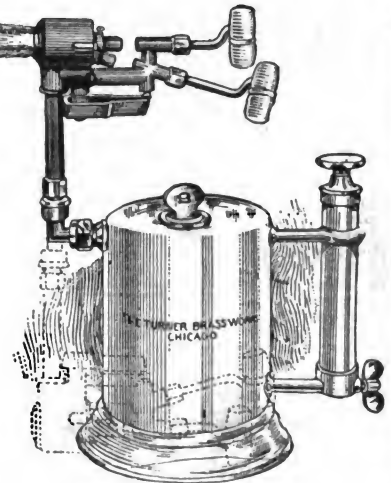
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are superior to all others for work requiring high heat, such as Brazing, Tempering, Annealing, etc. They have been the Standard for 7 years with Rubber Tire Workers.



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TURNER BRASS WORKS**

63 No. Franklin St., CHICAGO.

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Full particulars about a splendid investment are given on page xxxi. It is a unique opportunity.

ONE SMITH WRITES:

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It is proving extremely popular. The supply is limited. Hence we say, don't delay.

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SEPTEMBER AMERICAN BLACKSMITH**

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SUCCESSORS TO C. CROTHERS, KANSAS CITY, KAN.

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cription of our full line.

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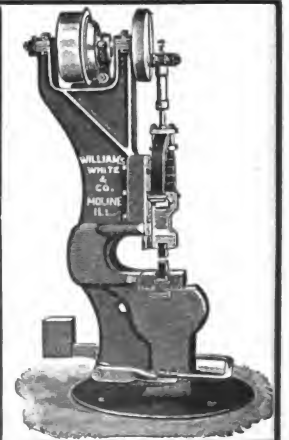
WOODWORTH KNIFE WORKS, - NUNDA, N. Y.
ESTABLISHED IN 1876.

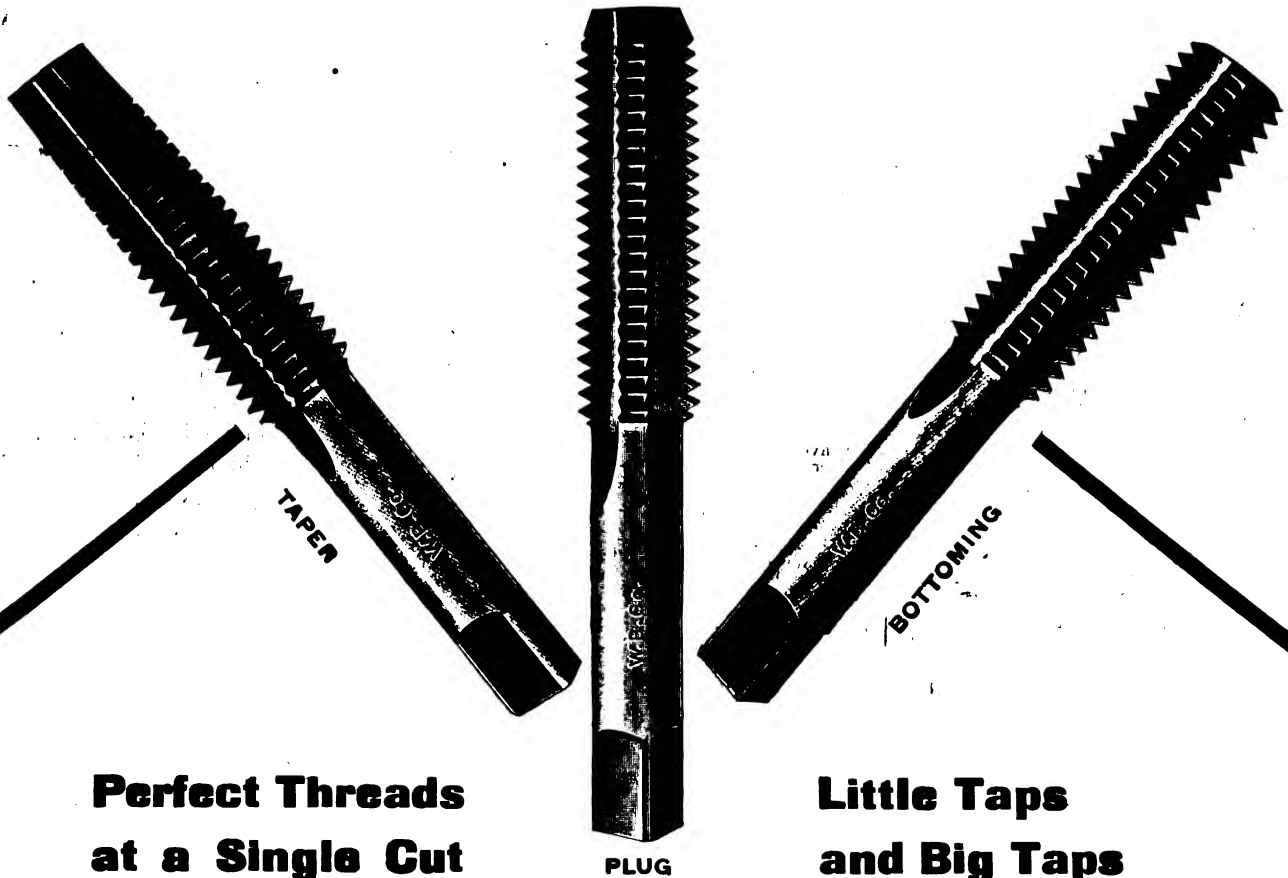
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MOLINE, ILLS., U. S. A.

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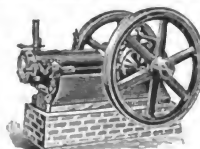
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ON PAGE XXXI

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DO STUNTS

and make the "other fellow" go 'way back and sit down.

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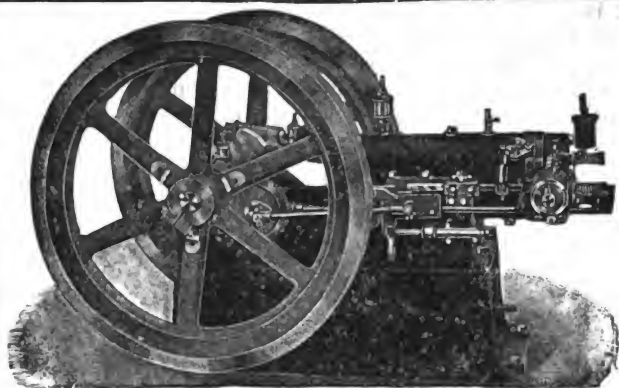
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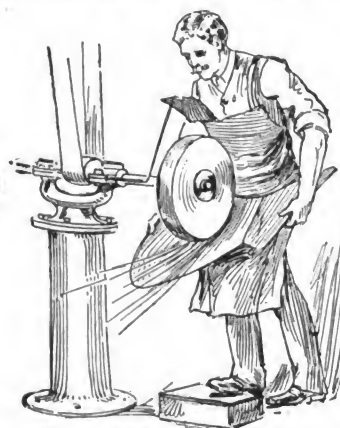
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136 Page Catalogue for the Asking.

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Mail orders receive very prompt attention.

Truly yours,

CAMPBELL IRON CO.

ST. LOUIS, MO.

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagon Making

VOLUME 4

OCTOBER, 1904

NUMBER 1

BUFFALO, N. Y., U. S. A.

Published Monthly at 1889-1844 Prudential Building, Buffalo, N. Y., U. S. A., by the

American Blacksmith Company
Incorporated under New York State Laws.

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\$1.00 per year, in advance, postage prepaid to any postoffice in the United States, Canada or Mexico. Price to other foreign subscribers, \$1.25. Reduced rates to clubs of five or more subscribers on application. Domestic long-time rates: Two years \$1.60; three years, \$2.00; four years, \$2.50; five years, \$3.00; in advance. Single copies, 10 cents. For sale by all foremost newsdealers. Agents for Great Britain and Ireland, J. W. Jackman & Co., Ltd., 39 Victoria St., London, S. W.

Subscribers should notify us at once of non-receipt of paper or change of address. In latter case give both old and new address.

Correspondence on all blacksmithing subjects solicited. Invariably give name and address, which will be omitted in publishing if desired. Address all business communications to the "American Blacksmith Company." Matter for reading columns address to the Editor. Send all mail to P. O. Drawer 974, Buffalo, N. Y. Cable address, "BLACKSMITH," Buffalo. Lieber's Code used.

Duly entered as second-class mail matter, at Buffalo, N. Y. Act of Congress, March 3, 1879.

Volume Four Begins.

With this issue begins a new volume of THE AMERICAN BLACKSMITH, and with it the publishers desire to assure subscribers that no effort will be spared to make the paper more interesting and readable in the future than in the past. Arrangements have been made for articles from the foremost writers of the craft. Reading matter of greater variety and value will be presented in the coming volume than ever before. Though most of the subject matter has already been determined upon, it is not too late for readers to ask for articles upon any special topics, the only restriction being that the articles asked for must be more or less related to some branch of blacksmithing. The publishers desire to thus encourage readers in asking for what they want. It has been said in these columns before, and it cannot be said too often, we want our readers to look upon THE AMERICAN BLACKSMITH as their own particular paper. We are much gratified that our readers display at all times such a lively interest in all that appears in our columns. The numerous comments, questions and answers are always gladly received. Further, we wish to add that

our reading columns are for our readers first, last, and always, and that no advertiser controls them or can buy any part of them at any price.

To Our Present Readers.

During the month of October the publishers of THE AMERICAN BLACKSMITH have a favor to ask each one of its many readers. At this time, with the commencement of the new volume, it is desired to add many thousand new subscribers to our lists. The paper is to be made more readable and attractive than ever. If you find anything about it you don't like, tell us. If you are pleased with the paper, tell the other fellow. The more subscribers we get, the better we can make the paper. We want your help in making it better. You can do this very easily. We want every subscriber, we want you, to tell your neighbor or brother craftsman how much you like THE AMERICAN BLACKSMITH and get him to take the paper. As a reward we will extend your own subscription six months for each new subscription you send in, one year for two, or we will credit you with three years for four new subscriptions. We want each one of our present subscribers to make a point of it to get us at least one new reader during October. The special inducement offered above makes it well worth while. You render us and the other fellow both a real service. Will you do it, soon, before you forget it?

Bad Debts and Their Handling.

Many a craftsman has been through the hard experience of having what to all appearances was a good trade yield him but the bare necessities of life, due to that old bugbear, bad debts. While some States have lien laws on their statute books that permit work to be held in the shop as a security for payment, such laws are of little practical value. As a rule the labor of blacksmiths and wagon makers receives much less protection by law than that of other craftsmen. Hence in most cases the smith must rely upon his wits and fore-

sight to avoid the losses of bad debts. The subject is an important one, and short experiences from some of our subscribers would, we doubt not, make interesting and profitable reading, especially to the younger generation. If you know a man for a rascal you get your money in advance, of course, but how do you treat the customer who is only doubtful, and how do you handle accounts that give signs of death by old age? Let us hear from you.

In this connection the publishers cordially invite correspondence from all those, in any section, who feel the need of adequate labor lien law protection, and who would be willing to put forth some slight effort in that direction. The things worth having are rarely obtained without an effort, and agitations often bear benefits. Are not lien laws worth an effort?

The Carriage Smith's Noon-hour Reflections.

Lazily, dreamily, floated up the smoke from his old corncob pipe, curling wreaths about his head and interposing misty curtains before his half-closed eyes. Seated outside his shop, protected from the rays of the midday sun, with the peace of a mid-summer noon without and a good dinner within, this wagon blacksmith felt more than usually contented with himself. A good solid morning of jobs rapidly undertaken, skilfully performed and promptly paid for, contributed to his sense of optimism, and as his mind rambled through the morning's happenings he found himself hunting out the reasons why he liked his trade. "I am my own boss; work when I please and as I please. My work is at home always; I eat at my own table and sleep in my own bed. I have plenty of work every day in the year; no strikes and no walking delegates. There are no rainy days to interfere with my trade. In a certain sense I am a public benefactor, always putting things to rights. The harder the times, the more people have their vehicles repaired instead of buying new ones. If

my pay is doubtful, I can hold the work for the pay." There's no telling how much further his meditations would have carried him, but the whistle from the neighboring canning factory warned him that the noon hour of that day had gone for good, so with a knock of his pipe to remove the ashes, he began the afternoon's work with renewed energy.

Well-Known Figures in the Blacksmithing Craft.—1.

Daniel Corbin was born in the town of Green, New York State, in 1839, and started to learn the trade of horseshoeing when but fifteen years old. He has worked at his trade ever since and by the end of this year will have covered a half century of horseshoeing experience. He is a very picturesque character and can tell some very interesting tales of the horseshoeing of years long ago.

The pictures shown herewith are of the exterior and interior of his present shop at Friendship, New York, where he conducts what he calls a "Blacksmith finishing school." Here he trains young men, who have done practical work in other shops, to do special shoeing in the case of lame and fast horses. He gives them a course in horse anatomy, having a good library in his shop for that purpose, and also illustrates, with leg bones and hoofs, perfect and faulty formations, and how to shoe for each.

He has a wide reputation as a shoer of lame and fast horses and has originated many devices which he preferred to give out for the good of the craft rather than to keep them for his own profit—a man of broad mind.

At different times in his career he has shod some of the fastest horses in the country, among which are Joe Patchen and Lou Dillon, and graduates of his school are now practicing at many of the well-known racing stables.

The shop of Daniel Corbin contains a large and very interesting collection of relics, one group of which shows the progress of horseshoeing from the two-pound shoe of a cart horse of fifty years ago to the eight-ounce aluminum shoe of the modern racer. This collection

also contains shoes worn by great racers on the occasions when they made their fastest time. The shop is very picturesque and in a more orderly state than the pictures would indicate.

Mechanical Hands.

C. M. S.

Probably most of the readers of this magazine are not familiar with the fact that the different types and grades of mechanics are indicated by the thumbs and fingers, and the hands as a whole.

The writer has been a close student of character reading by the hands, their shape, lines, signs, etc., for many years, and the following statements may be accepted as proven facts.

To begin with, short thumbs and fingers are seldom found on a natural born mechanic. The man with short

clined to details in everything, and take more interest in new ideas, especially if the joints are developed. They are more fussy over their work; little things worry them. Where the short-fingered man is going along with his work in an easy going way, his long-fingered neighbor is fretting and doing things over, trying to get them more to his liking.

If the fingers are long and spatulate, i. e., flatten out wide at the points, you will find the owners restless, active, continually working out new ideas, and they never want to do things as other people do them, they must originate a way of their own. These men with spatulate fingers will never work long at anything like duplicate work, it irritates them, while the short-fingered men prefer such work in most cases. Often the man with

spatulate fingers is not a finished workman; he is more of a "jack of all trades;" he can do anything and everything, but in doing so many things he cannot do any in first class shape, but you may always depend on him for new ideas, often something startling, or even ridiculous.

You will almost, without exception, find the man with large, coarse hands, with developed joints is a natural mechanic, and a fine workman; while those with small

hands, especially if the fingers are pointed, invariably have big ideas and try to do something wonderful.

If you want a practical workman who will turn off a large amount of work with out fussing over it, then get the man with the short thumbs and fingers. If detailed work of a fine nature is to be done, select the man with the medium, or long fingers and developed joints. But if you need a man who can change from one thing to another and give you ideas enough to make you dizzy, and never tires of changing, then find him of the spatulate fingers and you have him sure. Never expect new ideas (excepting by accident) or much reasoning power from the person with short, stumpy thumbs and fingers, for it is not there.

The readers of the AMERICAN BLACKSMITH will find by being observing that not only the hands, but the face and general appearance are indicative of



EXTERIOR VIEW OF DANIEL CORBIN'S SHOP.

thumbs and fingers may be an excellent workman, often is, but he follows along a beaten track; does what he has learned to do, but he seldom advances any new idea and often jeers at his long-fingered fellow workman for trying experiments along new lines.

The man with the short fingers will get off the greater amount of work in most cases, for he is not so particular as the long fingered man. He doesn't like to be bothered with details; he sees things as a whole; he wants to get something done, and does it.

There are some exceptions to this rule, however, and they are the men with the very short, fat fingers. They are generally too lazy and inconsistent to do much, or care for anything but animal comforts. This class have very short thumbs which are large and full between the joints.

Men with long fingers are more in-

character and calling, and the up-to-date employer must be a reader of these signs as well as a director of men.

The Gas Engine.—2. Principle and Construction. E. W. LONGWICKER.

In continuation of the article in the September issue on the subject of gas engine construction, we will endeavor to allude to the construction of the various styles of governors, carburetors and sparking or igniting devices in use on gas engines, and their method of operating.

Blacksmiths' engines are generally fitted with what is known as the hit-and-miss governor, but as the blacksmith with a gas engine is supposed to know something about them all, he will consequently be called upon to repair automobiles and marine engines which are controlled without a governor.

The operator of an automobile or a boat is always supposed to be present when his engine is running, consequently he decreases the speed of his motor by closing up his throttling valve which controls the admission of air and gas to his engine, and by setting the sparking device back so as to make the spark later, according to the speed of the engine. When increased speed is desired the spark is advanced and the throttle opened at the same instant or the latter a little in advance of the former. Consequently, the control of the boat or automobile engine generally depends on the operator. The hit-and-miss governor, with which stationary engines are largely fitted, may be of the centrifugal, wheel, or pendulum variety.

The centrifugal governor is one which has a pair of balls revolving around a central shaft or stem, to which the arm of the balls is fastened by means of a hinge joint. The balls are usually linked together by means of a spring or pair of springs.

When at rest the springs and weight of the balls cause them to hug or lie close to the shaft, but if in motion the rapid rotary movement of the balls causes them to spread and stand away from the shaft. Thus the balls have a

spreading and contracting movement according to the speed of the engine. The cut-in and cut-out arrangement depends on this *rise and fall* of the governor balls for its action. Any one having an engine with a centrifugal governor can readily determine for himself the principle upon which it admits or cuts out the charges to the engine by manipulating the governor balls when the engine is at rest.

There are several varieties of wheel governors used by different manufacturers of gas engines. They are called wheel governors because they are built in the flywheel of the engine and the revolution of the flywheels to which the governor is attached serves to affect the

variable before the governor can act.

This is the reason that the gas engine is considered very irregular in its speed by those who have not closely studied its governing principle. It shows a steadier speed when loaded nearly to its full capacity or run at a very high rate of speed.

The carburetors that are commonly used on stationary engines and automobile engines as well, are more properly called mixing or atomizing valves. The word *carburettor* more especially refers to an arrangement where a large surface of gasoline is exposed to a current of air. In its passage the air absorbs vapor from the gasoline. But in the atomizing valves which are largely

used in the stationary gas engine, the rush of air on its way to the interior of the cylinder, for the purpose of filling the vacuum behind the piston, has in its path a small opening which communicates with the gasoline reservoir, and the suction draws gasoline from this opening, in its raw state, with such energy as to atomize and unite or mix it with the air as it enters the cylinder. The intent of all these admission or atomizing valves is to have the gasoline opening or communication at a point where the rush of air

is greatest or at the most constricted part of the air passage so as to insure a sufficient supply of gasoline at all times. Some of these valves are also fitted with a float-feed arrangement which allows the gasoline in the supply cup to remain at a constant level, which is just below the point or opening at which it communicates with the air current. A float feed arrangement, if properly constructed, is simple and easily understood and therefore desirable. Blacksmiths, no doubt, have engines offered them which operate on the gravity feed method, where the gasoline tank is placed somewhere from two to six feet above the engine and is fed to it by gravity or its own weight through a suitable pipe and valve which connects the tank with the engine. With this method a gasoline admission valve is



INTERIOR VIEW OF MR. CORBIN'S SHOP, SHOWING THE FORGE.

governor weights or balls, to which the hit-and-miss mechanism is attached.

The pendulum governor is not very largely used in present gas engine construction, though there are several firms of note which are equipping their stationary engines with the pendulum governor.

It consists of a weight attached to an arm which is suspended from a horizontal rod by means of a pivoted joint. The horizontal rod is actuated end-wise by means of a cam, and a high speed or quick end movement of the rod causes the pendulum weight to lag behind and cut out the charge. On a slow movement the weight of the pendulum more nearly keeps pace with the rod and the hit-and-miss mechanism engages and admits the charge. The gas engine is therefore governed on fluctuations of speed. The speed must necessarily be

generally used which is opened by a positive cam movement. However, a float feed valve may be used to advantage even with the gravity feed arrangements. Many of these spray or atomizing valves are operated by what is known as *air-lift*. That is, the valve pallet is held to its seat by means of a spring with just sufficient tension to keep it up snugly, this valve being placed directly in the air passage, so that all the air has to pass directly through the valve. The suction of the piston lifts the valve against the tension of the spring. This is why it is called an *air-lift valve*. These valves are often made independently of the float feed cup, the latter being connected by means of a short nipple to the valve. Nearly all of the gasoline engines used by blacksmiths will be fitted with one or another of the styles of mixing or carburettor valves above described. The space allotted in this series of articles will not admit of detailed or minute description and illustration of these valves. But this general description will enable any one to classify and more easily to understand the carburettor valve with which the engine he owns or may purchase is fitted.

The subject of ignitors for gas and gasoline engines is one of much importance and usually of great interest. Apparatus for three methods of ignition only, will be referred to in this article. The first, hot tube ignition, Fig. 1, while yet in use to some extent, is fast going out of use. It consists of a hollow tube (T) closed at one end and threaded to screw into the cylinder so as to communicate with the combustion chamber (D). Around this tube is fitted a cast iron chimney (C) lined on the inside with sheet asbestos, to retain the heat, and a port through the lower end of the chimney to which is attached a gas or gasoline burner (B) which directs a hot, blue flame against the tube, which becomes heated red hot within a few minutes. The tube being closed at the upper end, the gas is pushed or crowded up into the tube at each compression until it meets the red hot part, when it is promptly ignited, which sets the entire charge on fire.

The most common method of ignition in the stationary engine is what is known as the Hammer Break Electric Spark. See Fig. 2. The hammer and point (H) and (P), which make the break, extend into the combustion chamber and the spark is made in the midst of the explosive mixture, promptly igniting it. The stationary contact point (P)

must be completely insulated from the engine so that the spark can only be made at the point of separation of the electrodes. The little hammer (H) is pressed down on the stationary electrode (P) which makes the contact, and the electric current at once begins to flow, because the circuit is closed. The wire connections from the battery (B) through the spark coil (C) to the engine make a complete circuit for the electric current from the battery or source of current whenever the hammer or movable point is brought in contact. By the property known as self-induction, the coil acts as a sort of a reservoir or

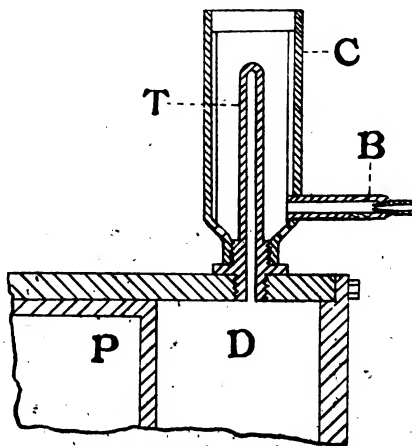


Fig. 1.—CROSS SECTION OF HOT TUBE IGNITOR.

store house for the electric energy. As soon as the circuit is broken by the hammer separating from the other point, the current is broken, and the coil lets go its reserve and in its effort to jump the gap between the two points, the spark results. The closing of the circuit and the breaking of it is then all done within the combustion chamber at the point where the electrodes come in contact. The view (D) is a cross section.

The jump spark system of ignition depends also on an electric current and a spark, but the mechanism is different. A spark-plug and a Ruhmkorff coil are in the circuit. There are no moving parts in the cylinder. One of the platinum terminals in the spark-plug is completely insulated from the other, the two standing into the combustion chamber from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch apart. The mechanism closing the circuit is outside of the cylinder, somewhere on the engine and when it is closed the vibrator on the coil causes a succession of sparks to jump across the air gap between the points in the ignition chamber, which ignites the charge. This is the system of ignition used almost exclusively on automobiles.

Only the igniting devices themselves have been touched upon. The current

may be generated in several ways, by batteries, magnetos, sparkers, miniature dynamos or the like.

(To be continued.)

Does a Gas Engine Pay?

S. J. PEMBERTON.

I bought a shop four years ago equipped with six pairs of tongs, five hammers, an anvil, a 40-inch bellows, a Mole tire shrinker, a Little Giant drill press and a forge. With these tools I was unable to polish or grind anything. I ran the shop in this way for two years, but did not make a living. The third year I put in a 2½-horsepower Weber Junior gas engine, an emery wheel and a polisher, a Universal tenoning and boring machine, and a ten-foot fifteen-inch swing engine lathe. Now I can grind coulters and make a better job than I could by hammering them. Also with lister and plow shares I can grind to shape after they are roughed a great deal quicker than in the old way. Since putting in my engine I have all the work I can possibly do, as there is no other shop in the county which is as well equipped. I have customers come a long way in order to get their discs ground and their wagon, plow and lister work done at my shop, for they consider the work turned out of my shop superior to that of my neighbor blacksmiths. My lathe comes in handy, as I am in the wheat belt and there is a great deal of machinery to be repaired. I received the job of rebuilding a traction engine last summer, which had fallen twenty feet through a bridge, all because I had my engine and lathe to do the work. I can run the engine all day on a gallon of gasoline, which costs me 20 cents. It will pull my lathe, tenoning and boring machine, and emery wheel all at the same time if I need them. The readers of THE AMERICAN BLACKSMITH can judge from the above as to whether it pays to install a gas engine. I think gas power is the best thing a blacksmith can have in his shop.

Filling Sarven Patent Wheels.

W. OTTO.

A Sarven hub is to many wheelwrights a hard problem, and some even go so far as to say that it cannot be refilled so as to give satisfaction. This is a mistake, and if the wagon worker will take proper care, he can fill a Sarven patent wheel so it will be as good as new. The following method will make a Sarven hub just as solid as it can possibly be made:

Having removed the tires and felloes, proceed to take out the rivets and remove the spokes. In removing these

rivets, care should be taken so as not to nick or bend the flanges. After the spokes are all out, tap the flanges gently all around, so as to spread them slightly, about 1-16 of an inch wider than they are at the base of the mortise.

Now select the best spoke of those removed and use it as a pattern, making the new ones exactly like it. Proceed to fit the new spokes in the hub, one at a time, finishing and driving each one before taking the next one. If some of the spokes are too large and are inclined to force the others out, remove one and trim it off a little. Do this until all the spokes stay where they are driven. Care should be exercised so that the spokes are not too narrow at the mortise or the outside, but have them fit exact, making a solid bearing, one spoke against another.

When the spokes fit perfectly, remove them from the hub and glue them as follows: Warm the hub slightly so the glue will adhere to the wood, and then with a small brush paint the inside of one mortise and dip the end of a spoke in the glue and drive it home. Proceed in this manner until all the spokes are driven, then set the partly finished wheel aside to dry.

When the glue is quite dry, but not hard, bore holes and rivet. Next rim and tire the wheel. It is supposed that the readers of *THE AMERICAN BLACKSMITH*, are familiar enough with the tiring, so we will not go into details.

Some craftsmen, after tiring the Sarven wheel and allowing it to cool, re-rivet the hub, making the hub almost as solid as if it were new.

The Painting of Farm Wagons.

A. W. BURNS.

The average country shop painter probably does more farm wagon painting than any other class, and the readers of *THE AMERICAN BLACKSMITH*, who are painters, will be interested in the method of proceeding with this class of work.

As in all painting the first and most important thing to do when the job arrives in the paint shop is to prepare the surface for the first coat of oil and pigment. The linseed oil coat is best applied before the irons are fitted, as it is then much easier to clean off the grease and soot marks usually left by the smith.

In effacing these marks, use cloths saturated with benzine and wash the surface lightly. This will remove any

grease and oil, and if afterwards wiped dry with a clean cloth the surface will appear clean and be ready for the first priming or pigment coat, which should be somewhat like the finished shade. Putty all holes and crevices after applying the priming coat and then apply a lead coat as much like the finished shade as possible. The color and varnish coat is next applied, after which the stripping and finishing may be done, but if an extra coat of color and one of varnish is needed, the finishing is done before the last coat of varnish is applied.

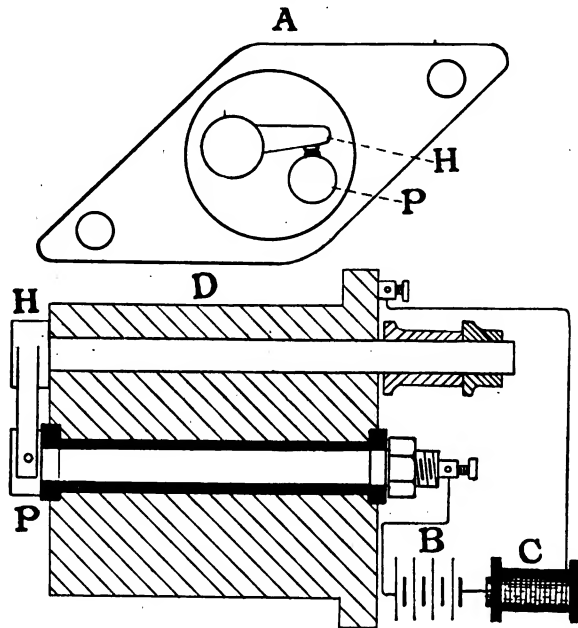


FIG. 2.—DIAGRAM OF THE HAMMER BREAK METHOD OF IGNITION.

Some of the most popular colors for farm wagons are a red running gear with a green body or yellow on the gear with a brown body.

A beautiful brown can be made by mixing five parts of Indian red with one part of Prussian blue and enough yellow added to give it that richness so much desired in the browns.

Right here might be said a word of warning—don't mix your paints hurriedly, as they will not last as they ought to and as they would if more time were taken in the compounding.

How One Smith Estimates Prices.

"Terribly funny how some shops ever make enough to keep body and soul together, to say nothing of what the little ones at home need. A farmer that's any good can raise enough to feed his folks, but how a lot of them hit-or-miss blacksmiths get both ends together is one too many for me." Baxter, the blacksmith was speaking.

"Perhaps they have unlimited credit at the store," I replied. Baxter was one of the leading men in our thriving

little farming community, and some of my most pleasant and profitable half hours have been spent in his shop. In less than four years, starting without a penny or customer, Baxter has, through skill, industry and economy, pounded his way to ownership of his shop, 30 by 60, and the lot on which it stands. His tight little gas engine whirrs incessantly in a corner, and two husky helpers have enough work to keep them going all the time. His recipe for keeping help satisfied is to keep them busy.

"I drove over to the Fair yesterday,"

Baxter went on, "and before I started back I dropped in on Ferris. He's the oldest man there, and one of the best mechanics, but he barely gets a living. What's the trouble with him? Never saw a man use his hands so well and his head so poor. He hasn't got any idea what his time is worth, and will trust anybody. Why as I walked into his shop yesterday, I found one of those bums that follows fairs around, living by their wits off other people's money. He had an old rig loaded with a lot of soap-and-water hair tonic, and Ferris had put in a good three dollars' worth fixing an axle, but he kicked like a steer at two fifty, so down the price went to two dollars. I knew mighty well

there was almost that much in material in the job, and then what do you think? He offered Ferris hair tonic in payment, and finally paid twenty-five cents and gave his note due in sixty days for the rest. Ferris never saw the man before and never will again, and as for the note, it isn't worth making a cigarette out of. I told the boy what I thought of him—told him he owed it to his family to use a little more judgment. Oh, I lit on him good and hard, and I hope it does him good. I always like to help my brother craftsmen whenever I can. Spent about an hour showing him how I used to find out what a job cost me when I worked alone like he does. How did I go about it? Well, first I found out just what his average expenses were a month. We added up his shop rent, his expense for coal per month and the average cost of small items like light, heat, stationery and such like. Then we put in enough to cover average expense for new tools. This brought the sum total to about twenty-five dollars a month, or about a dollar's expense for

each working day. Deducting the time lost between jobs and other little delays, Ferris figured that he worked steadily on jobs on an average of seven hours each day. That gave us the figure we were trying to find. You see according to our calculating, he had to clear fifteen cents on each hour's work he did just in order to pay his expenses. Next we figured his clear profit ought to be forty cents for a working hour, at seven to the day, this making \$16.80 clear a week, little enough, too. Just to give him the hang of it, I figured out the job he had done for the sharper. The stock had cost him a dollar eighty-five laid down at his shop. His time, to cover expenses and profit, was worth fifty-five cents an hour. The job took about two hours, or a dollar ten, so the price he should have asked was three dollars. Ferris says he loses about one dollar out of ten on bad debts, so to allow for them he ought to add ten per cent. If I'd been Ferris, I'd have asked three thirty, and made him ante up, too, then and there."

A Home-Made Power Hammer.

WALTER M'COY.

The mentioning of my home-made power hammer recently has brought me so many requests for specifications

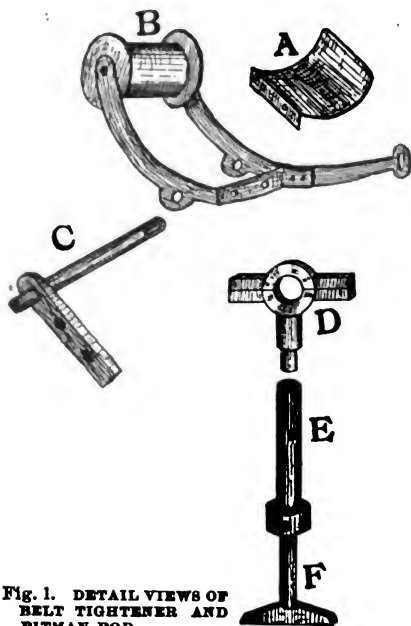


Fig. 1. DETAIL VIEWS OF BELT TIGHTENER AND PITMAN ROD.

of how to build it, that it is impossible for me to send drawings and specifications to each one, so I submit here a sketch and an explanation of how I made my hammer.

I run my hammer about 300 blows per minute with a tight belt, or by loosening the tension of the belt, simply by lifting the foot, I can cause it to strike as slow as the work may require. For the framework of my hammer, I

used two pieces of hard pine 3 by 6 inches, set side by side from floor to ceiling. Then I made a framework out of the rim of a header drive wheel, $\frac{3}{8}$ by 8-inch iron. Straighten and cut the face plate in this frame 30 inches long. Now cut a piece 22 inches long and bend 6 inches of each end at right angles, in opposite directions. Rivet

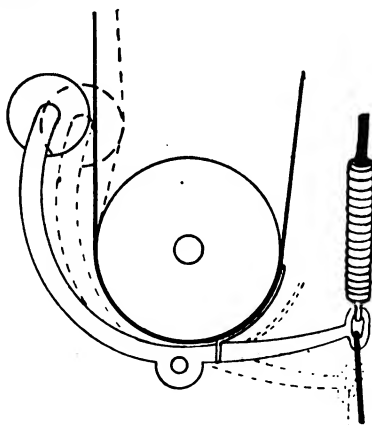


Fig. 2. OUTLINE VIEW OF BELT TIGHTENER AND BRAKE.

this to face plate 6 inches from the top. Now cut another piece 22 inches long and bend in the shape of a "U" with the opening down and rivet to bottom of face plate. Bolt this frame to the 3 by 6-inch posts, so that the lower end of face plate is 3 feet, 6 inches from the floor. For flanged belt pulleys, I used Stacker pulleys from a threshing machine with open sides turned together and keyed to shaft, and one I made by shrinking bands edgewise on ends of a common 6-inch face pulley. I use a $3\frac{1}{4}$ -inch leather belt. Make the slide run for hammer 16 inches long. Take two pieces of $5\frac{1}{4}$ by 2-inch iron, 16 inches long, bore three slot holes in each for taking up wear. Then take two pieces of plow steel $\frac{1}{4}$ by 3 by 16 inches long and bore three holes in each to match the slot holes. Bolt these to lower end of face plate with six half-inch bolts.

To make hammer head, take common iron 1 by 3 inches and 3 feet long, forge ends as shown and bend in middle, making head 18 inches long with dovetail groove to hold the die. This is made of 2 by 3 Black Diamond tool steel, the peen end of which is $2\frac{1}{2}$ by 1 inch. I made my first anvil by welding a steel face on a railroad iron and used it for over a year on a 10 by 10 oak post set in the ground 3 feet under the floor. This gave very good satisfaction but not so good as the 500-pound cast iron base which I have now.

For the belt tightener, make a frame to suit the location of the hammer from the line shaft.

To make the guide, on the hammer head, which slides in the run on the face plate, take iron $1\frac{1}{4}$ by $1\frac{1}{4}$ by 12 inches long and one piece of plow steel $3\frac{1}{4}$ by $\frac{1}{4}$ by 12 inches long. Bolt these to the hammer head with four $\frac{5}{8}$ -inch bolts made of good iron or else they will not stand the jar. Put the fifth $\frac{5}{8}$ -inch bolt through hammer head below guide for the purpose of gripping the die. For my wrist wheel, to throw the hammer, I used a mowing machine wrist wheel and shaft, having a 4-inch stroke. For the spring I used an old 5-leaf, $1\frac{1}{2}$ -inch coach spring and re-bent it so the ends were 23 inches apart and 10 inches deep, measuring from a line drawn from end to end. The pitman connecting spring to wrist (see Fig. 1D, E, F), I made adjustable by forging a wrist box, D, and welding it in the end of a $\frac{3}{4}$ -inch gas pipe, E, and then forged a "T" fitting F, with a $\frac{3}{4}$ -inch stem to clamp to center of spring which connects with gas pipe by set screw. This allows adjustment of height of hammer for work of different thickness.

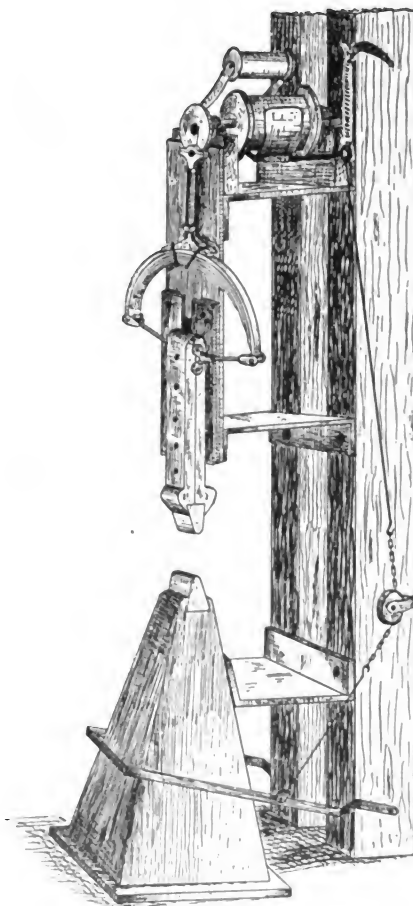


Fig. 3. A HOME-MADE POWER HAMMER.

Now to connect hammer with spring, forge two ears from $1\frac{1}{4}$ -inch axle stub, and bolt one to each side of hammer head with two half-inch bolts. Make four clevises, bolt two to ears on

hammer head and one to each end of spring and connect them with $\frac{3}{8}$ -inch bolts. Make the anvil die of tool steel with face 2 by 4 inches pretty well rounded, so that the corners will not cut

understands how to make the heads for the main leaves and draw the smaller ones to taper, the next step would be to drill the center holes and make the nibs and grooves for keeping the leaves in

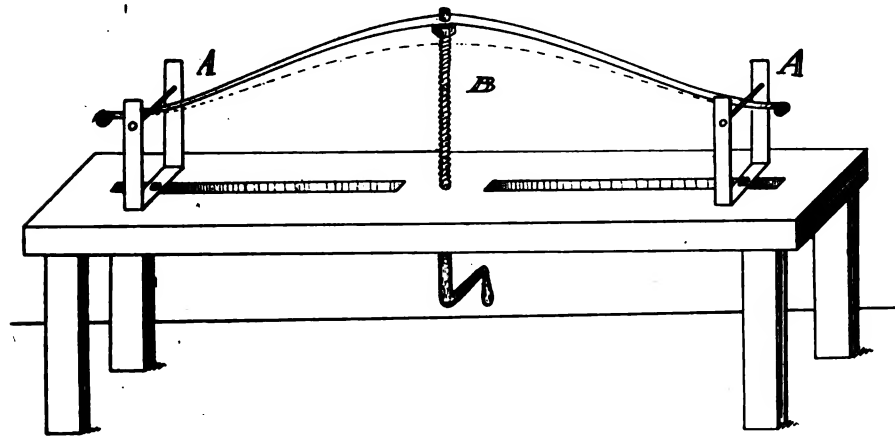
so as to make sure that the heat penetrates the steel. For this purpose a coke furnace is preferable. The spring factories use these, the leaves being heated as described for bending, the operation being performed quickly, so as not to allow the leaf to cool too much. A spray of water is then turned on the leaf until nearly cold. This is all the temper the cheaper grades of springs require. For the better class of work, however, the springs are oil tempered. A trough or tank is used, well filled with linseed oil and large enough to admit of dipping the leaf until cold. The temper is then drawn by placing the leaf over the fire until the oil is burned off.

Making Bar Shoes.

R. R. S.

The following description of the making of a bar shoe is written in the hope that the younger smiths, and perhaps some of the older ones, too, when called upon to fit a bar shoe, will know how to turn or make one.

As in all shoeing, care should be exercised in removing the old shoe and also any broken nails which may remain in the horn. Then take a shoe, about one size larger than the horse usually wears, and fit it to the foot; make a mark with the center punch where you want the bar to come. Now level the foot, cutting the loose scales away and trimming down nicely, but don't cut on the frog, as it never grows too large and,



A DEVICE FOR SHAPING SPRINGS.

cultivator shovels or discs in sharpening.

I will now leave this matter to the brothers of the craft and if any of them need further explanation, I will be glad to help them, and should they meet with success I would greatly appreciate a letter from them.

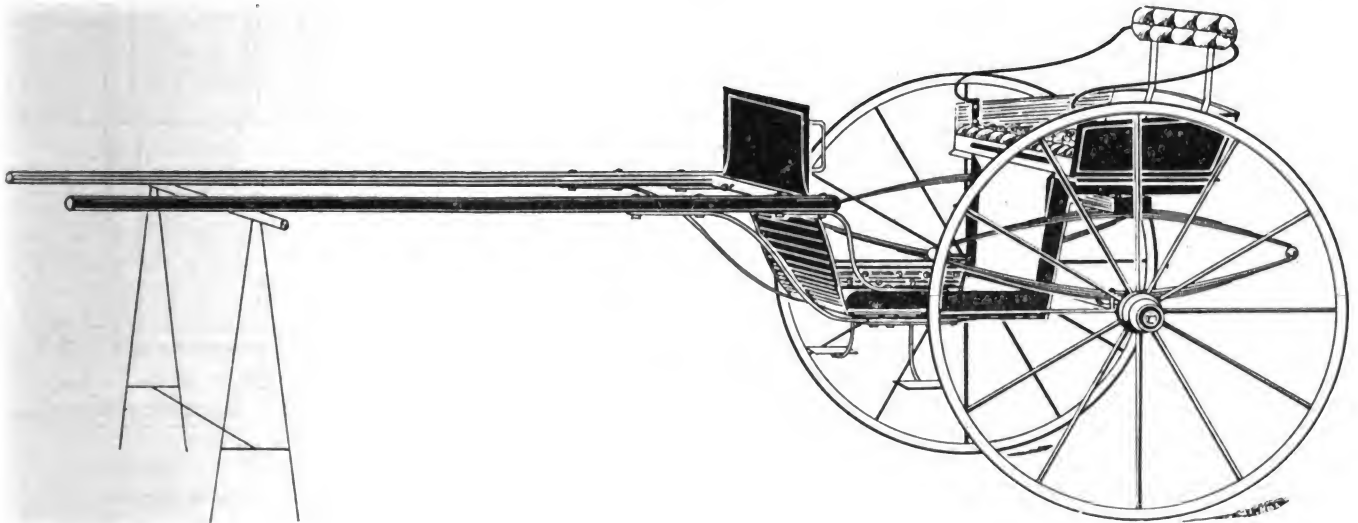
Spring Making and Tempering.

NELS PETERSON.

Very few carriage factories in this country make their own springs nowadays, except when some special shape is desired, and then only one is made as a pattern and sent to the spring factory with order for the number of springs wanted. Owing to the fact that I

place. This being done, the main leaves are bent to shape as shown by the dotted lines in the figure. The ends are held in place by bolts passing through forked irons, as at AA. The center is forced up slightly by means of a screw, as shown at B. The second leaf is then heated the full length, and by means of tongs and clamps is bent to fit the shape of the main leaves. The remaining leaves are then shaped in the same manner over the one preceding it, the forked irons being moved closer together, as required, according to the length of the leaf.

All springs are tempered, or at least



PERSPECTIVE VIEW OF THE RUNABOUT CART.

learned my trade in a place where the smith had to make the springs for every job that he built, as none could be purchased, and from the knowledge which I have of the methods employed in spring factories, I am able to give the following information.

Assuming that every carriage smith

they are supposed to be, but I do not think a man could temper a spring with any degree of satisfaction in an ordinary forge. The reason for this is that in order to obtain a uniform heat the full length of the leaf, one must have a fire long enough to heat it all at once, and not too quickly, but gradually,

unless scaly, should never be touched with the knife and then but sparingly.

Now heat the heels of the shoe and sharpen them ready to weld; with another heat bend the shoe at the mark you made and weld the heels together to form a bar, and then finish.

In turning a bar shoe care must be

taken to have it fit exact before welding and also to make the bar heavy enough to prevent its bending should the horse step on a stone.

Before welding on the toe calk, bend it a little to give it the same curve as the toe of the shoe. Then heat the toe of the shoe and hammer on the calk. Now bring to a low welding heat and sprinkle

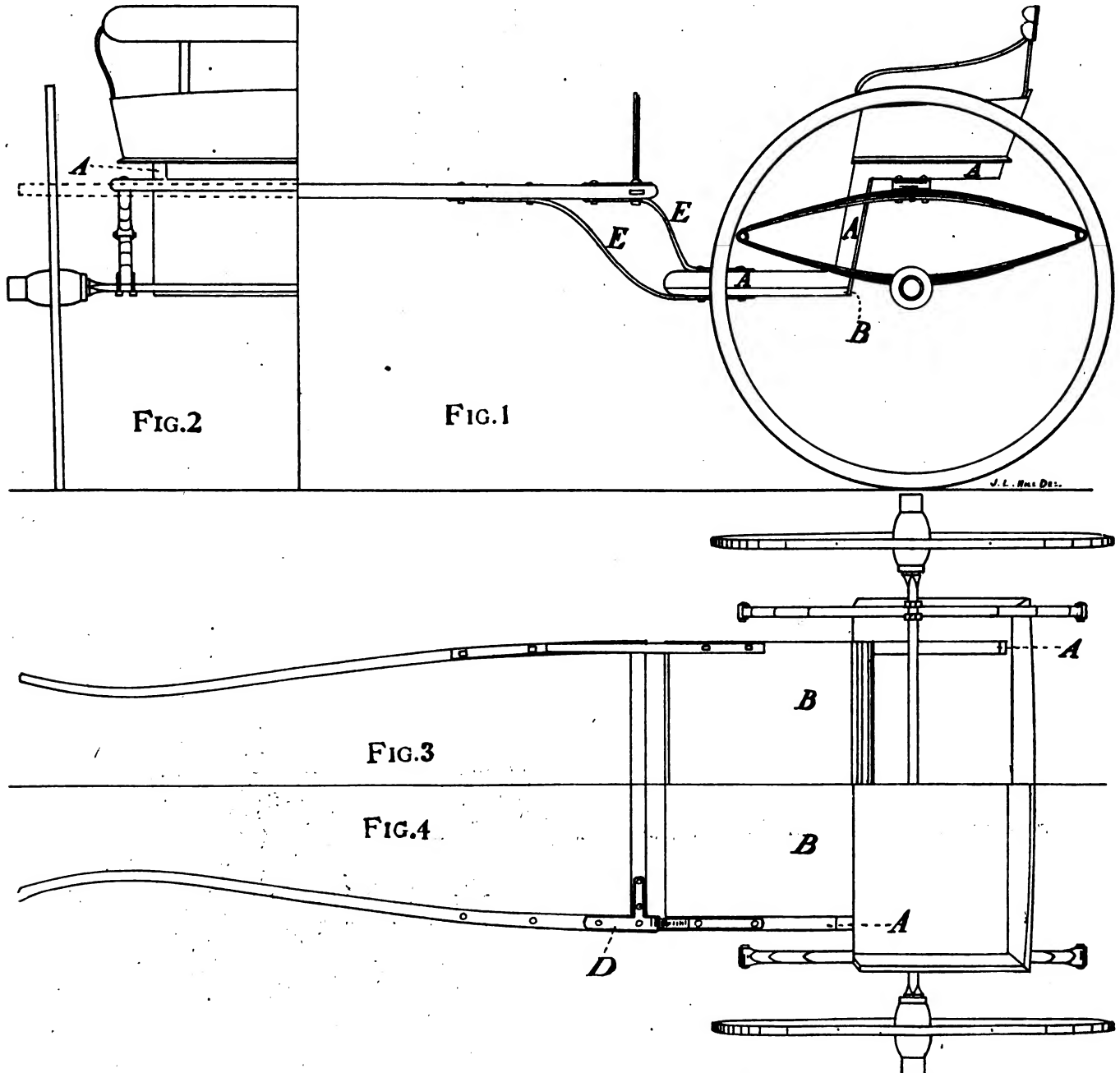
it will injure the hoof if the shoe is burned to the foot, and if the wall has been pared thin, the shoe is liable to burn into the sensitive tissues.

Plans for Making a Runabout Cart.

J. LAWRENCE HILL.

While this cart is similar to and bears the same name as the one illustrated in

side, and a light plate is screwed on the inside extending from the front almost to the end underneath the seat. After the plates have been put on with screws and plenty of white lead, put on the back panel. This goes up to the seat, is level with the top of the rockers and extends $\frac{7}{8}$ inch below the rockers so as to be even with the under side of the bot-



PLAN OF RUNABOUT CART. Fig. 1 SHOWS SIDE ELEVATION. Fig. 2, HALF OF REAR ELEVATION. Fig. 3, HALF OF BOTTOM. Fig. 4, HALF OF TOP.

with sand, heat again, and when good and hot, strike a few blows on the calk to fasten it, and then draw out. Follow the same method in welding the heel calks, and you will have as good a bar shoe as can be made.

A word of caution might be said here as to fitting the shoe to the hoof; don't fit the shoe while too hot, as

the July issue, it is different in design and construction.

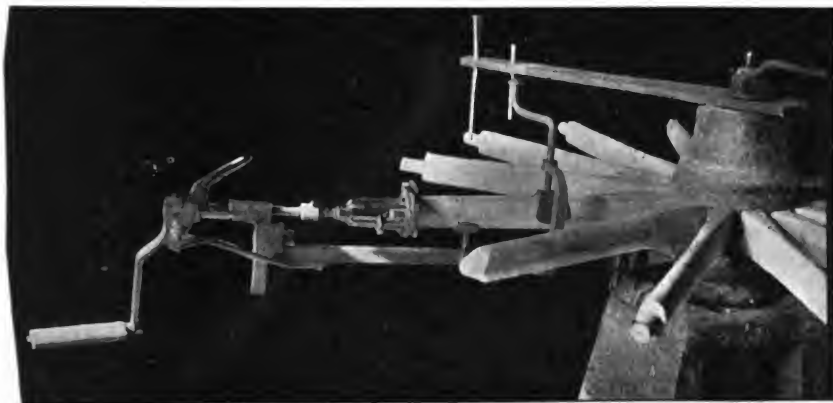
Fig. 1 presents the side view; A, A, A, the rockers, are $1\frac{1}{2}$ by $1\frac{1}{4}$ inches; B is the bottom, which is screwed to the underside of the rockers, and the edgesshould be rounded over, so as to make a good finish on the sides. The rockers are lap-jointed, glued and screwed from the in-

tom board. The panel coming down even with the bottom, prevents a joint showing at the back.

The shafts having been cut out and dressed up, are put together, and a plate shown at D, Fig. 3, is bolted on top, the object of this being to give a good bearing for the bolt heads, and also to keep the shafts together.

E, E, are made of spring steel, $1\frac{1}{2}$ by $\frac{1}{2}$ inches, and are bolted, as shown, firmly to shafts and rockers. There is very little spring to them, but as they have

play on the boring shaft. Also a $\frac{1}{4}$ -inch hole in the short end to make a hinge on the supporting iron coming from the bottom of the bed piece.



A MACHINE FOR BORING SPOKES.

to do so much work, spring steel is found to be the best.

This method of attaching shafts to the body, leaves the front open, it being filled in by a piece of flexible material, leather, rubber, or duck, the same as is used on tops. In one instance, however, the writer saw a piece of very thin sheet iron used, and it seemed to answer splendidly. It was fastened underneath the bottom board, and under the shaft bar. The idea can be seen in the perspective view of the cart.

Following are a few of the various dimensions: Wheels, 44 inches, with 1-inch spokes; track, 4 feet 4 inches, out to out; springs, 36 by $1\frac{1}{2}$ by 4 by 8 inches, and 36 inches apart on the axle.

Painting: Wheels, springs and axle yellow, striped black; other parts black, striped yellow.

A Spoke-boring Machine.

B. S. WARD.

The photograph shown herewith is that of a spoke-boring machine which I have made and which works very well. As I do not desire to have it patented, I will give it for the benefit of the craft. It is all hand wrought and can be made in a day by a man and helper.

The bed piece is of $\frac{3}{4}$ -inch calking steel, 24 inches long. One end is bent to a right angle, standing up two inches. Around this is formed a piece of thin iron, making a socket $\frac{3}{4}$ -inch square. It is not necessary to give any further dimensions, as any capable mechanic can make this machine from the photo.

Since the photo was taken I have improved the feed by moving it to the front end of the boring shaft, next to the head that holds the hollow auger. The feed lever has an oblong hole in it about four inches from one end so that it may

The other end may be 16 or 20 inches long and round. There should also be a $\frac{3}{8}$ -inch hole drilled in the boring shaft, $\frac{1}{4}$ -inch back of the socket head and a pin and small washer there to back feed. With this alteration the machine seems perfect.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

A customer was saying just the other day: "If bar shoes are good for bad feet, they must be good for good ones too." And he left a standing order for bar shoes all the time.

Soon as we get our tools arranged and in order, we are going to ask Tom Tardy to look in on us. Hope he'll feel like getting out of the rut then.

For a good all-around every-day-in-the-year welding compound add one pound of sal ammoniac to four pounds of borax; mix and melt. When cool, powder it finely and use the same as borax.

They used to drum it into us not to over-heat our tool steel. Now, with these new high-speed steels, they say, be sure and get them hot enough. Moral is, be sure you know your steel, and then act accordingly.

From Indian Territory a friend sends this receipt for welding steel, such as files, and the like: One pound of pulverized borax, three ounces of black oxide of manganese, half an ounce of carbonate of iron and half an ounce of sal ammoniac. Mix well.

Apprentices, send us your ideas of doing things. Your boss may not agree. We don't care for that. THE AMERICAN BLACKSMITH experimental shop is not wedded to antique methods. If your way is better we will let 25,000 others know about it.

These bad cases of cocked ankles that come into the shop are often due to heavy hill work. A good method of treating is to

lower the toe as much as possible, leaving the heels high, and then apply a long heeled shoe with calks. The shoe extends as much as one and a half inches back of the heel.

In the varnish room upstairs, the painter is always mighty careful to have one coat dry before he puts on another. Says this is one of the fundamentals. And when it comes to varnishing, his advice is to avoid changes, from hot to cold, dry to moist. Shun particularly draughts of cold air.

The secret of success in tool steel work may be summed up in two words, proper heating. Experiments have shown that comparatively good results may be had by a careful heating and manipulation of even the proper grades of steel, while careless handling may easily ruin the very finest.

A good method in use in THE AMERICAN BLACKSMITH experimental shop for cutting tires and the like is as follows: Old three cornered files are broken up into three-inch lengths and their temper drawn. One such piece placed on the anvil with the tire on top of it, two or three blows from the helper and the trick is done.

"Here's a little trick I learned from a boss smith down in Mississippi," one of the boys was saying the other day. "Very often you leave your fire for some time and find it almost out when you come back. Never heard of a better way of bringing it up quick than to toss on a handful of dry sawdust. If there's any fire left it will bring it up all right."

A successful Indiana smith we know of never lets a buggy go out of the shop with a rattling axle. The plan he recommends is to insert paper washers as needed to take up the wear until there is enough room to allow them to be replaced by a leather one. Do customers appreciate those little finishing touches even when not called for? His busy shop is the answer.

A circular band or hoop which is just a bit too large can very easily be shrunk without any hammering, upsetting or cutting and welding. Bring to a good heat and then dip horizontally into water till half the thickness of the ring is covered. When thoroughly cooled, heat and repeat the operation, this time turning the ring over and dipping the other edge first. This kink is of frequent use in the shop.

There's a certain smith in town who gets a great many orders for cold chisels from the machine shops roundabout, and has built quite a trade in them. We have heard him tell the helper often to be sure not to upset the steel, but always draw out and cut off. He selects his steel carefully, from 100 to 120 point carbon,—the harder the metal on which the chisel is to be used, the higher in carbon is the chisel steel he selects. The tempering he does himself, always choosing his shade of purple to a nicety.

They have been having considerable trouble down at the shop with their flatters breaking. Their usual remedy for such trouble was to occasionally anneal them, but now they have taken up another plan. The flatters are made solid, without any eye, but with a groove fullered around the shank. Then a twenty-inch length of a three-eighth-inch bar is bent in the middle, wrapped around the groove and the ends welded together. They find it easier on the hand to fit a wooden handle instead of extending the rod for that purpose. To do this, bend the rod up at right angles about three inches from the flatter. Securing a suitable piece of wood stock for a handle, bore a hole through it about three inches from the end and burn it onto the upturned iron end. Turn the point of this end over and fasten it down with a small band or coupling.

Forging of the Anchor.

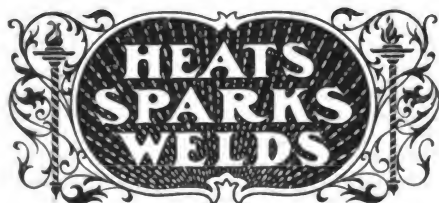
SIR SAMUEL FERGUSON.

Come see the Dolphin's anchor forged; 'tis at a white heat now,
The bellows ceased, the flames decreased;
though on the forge's brow
The little flames still fitfully play through the sable mound;
And fitfully you still may see the grim smiths ranking round,
All clad in leather panoply, their broad hands only bare;
Some rest upon their sledges here, some work the windlass there.

The windlass strains the tackle chains, the black mound heaves below,
And red and deep a hundred veins burst out at every throe;
It raises, roars, rends all outright—O, Vulcan, what a glow!
'Tis blinding white, 'tis blasting bright, the bright sun shines not so!
The high sun sees not, on the earth, such fiery fearful show;
The roof-ribs swarth, the candent hearth, the ruddy, lurid row
Of smiths that stand, an ardent band, like men before the foe;
As quivering through his fleece of flames, the sailing monster 'slo,
Sinks on the anvil—all about the faces fiery grow.

'Hurrah!' they shout: "leap out—leap out!" bang, bang the sledges go,
Hurrah! the jetted lightnings are hissing high and low;
A hailing front of fire is struck at every swashing blow;
The leather mail rebounds the hail; the rattling cinders strow
The ground around; at every bound the sweltering fountains flow;
And thick and loud the swishing crowd, at every stroke, pant "Ho."
Leap out, leap out, my masters! leap out and lay on load;
Let's forge a goodly anchor, a bower thick and broad.

For a heart of oak is hanging on every blow I bode,
And I see the good ship riding, all in a perilous road;
The low reef waving on her lee, the roll of the ocean poured
From stem to stern, sea after sea, the mainmast by the board;
The bulwarks down, the rudder gone, the boats stove at the chains;
But courage still, brave mariners, the bower still remains;
And not an inch to flinch he deigns, save where ye pitch sky high,
Then moves his head, as though he said, "Fear nothing—here am I."



Ordered that engine yet?

Lively campaign on in your parts?

Good crops, and money in prospect.

Don't you think it about time to organize?

Here we are, starting in on another new volume, Number IV.

Port Arthur is reported badly damaged. Probably due to its very numerous falls.

Those calendars won't last forever. Somebody's going to get left. Will it be you?

Have you a lawyer to take hold of bad accounts for you? Often it is the best and sometimes the only way.

Soft wood may now be artificially hardened and toughened by a process of vulcanizing. A valuable discovery.

Don't delay treating any of the ills discovered in the foot of the horse. Much depends upon prompt attention.

The first machine or mechanism of any kind that the modern world ever saw was a clock, the invention of a Moor.

Strange as it may seem, many men know more about the defects and shortcomings of their neighbor's shop than of their own.

A good place for a blacksmith is at Winifred, N. D. Correspond with Mr. Frank Thornton of that town. No shop exists there at the present time.

A wheat ranch costing \$60,000 a year to run and containing 9,000 acres is situated in Oklahoma. It is said to be the largest in the world.

Ever stop to think of cheerfulness in the light of a trade cultivator? The bright, cheerful, good-natured mechanic makes friends, and friends make trade.

When you change your address don't fail to send us notice, giving both your new and old address. This will save considerable time and trouble both for you and for us.

What's the trouble? Maybe we can give you light on some vexing problem connected with blacksmithing or wagonbuilding. That's what we are here for. Don't hesitate to ask questions.

Net profit is the difference between the money you pay out and the money you take in. Cut down expenses, cut out needless expenditures, stop wastes, buy closely—thus can you increase net profits.

An old smith recommends tempering small drills, screw drivers and the like by cooling in a bar of common soap. This will bring the hardness about right, without making necessary any drawing of the temper.

The advertising pages, many readers say, are as interesting almost as the other ones. Wideawake craftsmen find them an up-to-date index to new tools and improved devices. Whenever you write to a manufacturer who doesn't advertise in THE AMERICAN BLACKSMITH, tell him you think he ought to.

To prevent rust on machinery after thoroughly cleaning it, smear on this mixture: one ounce of camphor dissolved in one pound of melted lard with enough black lead in it to give an iron color. This mixture can be left on the metal indefinitely, but when removed the metal should be polished with a soft cloth.

Progressiveness in several shops has lately come to our notice. The owners have eased their work to a very marked degree. Several have put in electricity for lighting and running blowers and ventilation fans. One up-to-date smith operates all his machines by this power. What are you doing to keep abreast of the march of progress?

Electricity is the century's wonder. It drives our mills, hauls our cars, carries our speech and lights our way, yet we know not what it is. A current of 50 volts is

harmless, 500 dangerous, 5,000 fatal, 50,000 harmless again. Sir Oliver Lodge, an eminent scientist, now advances the startling theory that all matter is composed of electricity, and nothing else.

Honest dealings—Each issue of the paper contains an outline of our policy regarding unreliable advertisers. During the three years past, with that paragraph appearing regularly, not a dollar has been distributed on account of a dishonest advertiser. Rogues cannot buy advertising space in THE AMERICAN BLACKSMITH. Only last week we turned down a gold brick game—a proposition to sell shares in a gold mine to our readers.

During October don't forget we are offering readers a special chance to get their subscriptions extended without making a cash payment. Send us in one new subscription and we will give you six months credit on your own. For two new ones, we will extend your term one year. Remember, the subscriptions must be new ones and sent before November 1st. We want to double the circulation of the paper before January. We can do it if every reader will help by sending in just one new name. Remember the date.

Like hot-cakes.—Our calendar offer to readers proved instantly and immensely popular. They are going fast. The large number of orders for 50, 100 or 200 calendars received each day strengthens our conviction that AMERICAN BLACKSMITH readers are up-to-date, progressive, quick to recognize and seize a good business proposition. Advertise your shop. Present your customer with your calendar, your business card, the only printed matter on it. Have you placed your order yet? The supply is limited—no more when they are gone. Don't forget to read page XXXI.

Ten and twenty is the figure Tom cut his prices to not long ago. He claims this move brought him a lot of new customers, but when we pressed him to find out who they were, we found that many of them were of the slow-pay or no-pay kind, who couldn't get work done at the other shops at any price. You see Tom had sat down and figured out how much a set of No. 5 shoes was worth. Then he added the cost of nails, and found that ten and twenty gave him a nice profit, on paper, so down went his prices with a bump. Tom hadn't allowed anything for fuel, light, rent or losses from dead-beats. We are expecting a raise in prices in Tom's shop now any day, but he is finding it a much easier matter to put prices down than it is to put them up.

Light travels at the rate of over 186,000 miles per second, which would carry it a distance more than equal to seven trips around the world in that interval of time. In a year the space covered is about six million million miles, a distance no human mind can adequately comprehend. Hence we can have only a dim impression of the vast profundity of the universe lying beyond the confines of our little world, when we know that astronomers measure our distances from various stars by a scale, of which a light year is the unit. Some clusters of stars have been discovered, which though invisible to the naked eye, each embrace thousands and thousands of individual stars within their limits and measure a couple of light-years from one side to the other.

American Association of Blacksmiths and Horseshoers.

Have you sent for those plans yet? Probably you have been intending to do so, but put it off. Better write at once. Icy times and bad roads will be here before you realize it, so you ought to get your district organized without further delay. Our plans for forming local associations give the best way of getting the shops together for raising prices and advancing their interests. These plans may be had free upon application. They do not force you to take up the work if you don't choose to, but you may find them especially interesting. Have you ever thought your work ought to be bringing you more, or giving your family a better living? To raise prices is often a difficult problem, and we know of no better solution. Send for these plans, addressing us at Box 974, Buffalo, N. Y.

Are not better prices worth an effort on your part? Think what they mean. More money from the same labor, and every extra cent clear profit; a higher standing among your dealers, your fellow craftsmen and your customers, as well; a chance to lay up something against a rainy day. Better get prices up before sharpening time comes round. Better start at it before the bad roads come. Will you write? Today?

Due to our efforts, smithshop prices in Cortland, Cayuga, Tompkins and Seneca counties (N.Y.) were raised October 1st.

The N. R. M. B. A. Convention at Indianapolis.

One of the most interesting and enthusiastic meetings in the history of the Railway Master Blacksmiths' Association was held at the Grand Hotel, Indianapolis, August 16th, 17th and 18th.

The following officers were elected for the ensuing year: President, F. Keane; First Vice-President, D. B. Swinton; Second Vice-President, J. C. Sullivan; Secretary and Treasurer, A. L. Woodworth; Chemist, G. H. Williams. It was decided by ballot that the meeting place next year should be Cleveland, Ohio.

A vote of thanks was tendered THE AMERICAN BLACKSMITH for the courtesies extended the association last year as well as this, and this was after amended so as to cover any publication which had devoted space to the Association.

Engineered by the popular secretary, Mr. A. L. Woodworth, one of the unique features of the convention was the offer made by THE AMERICAN BLACKSMITH of

a five years' complimentary subscription to the master blacksmith who should be adjudged by the ladies as the handsomest one present. The Ladies' Auxiliary of the association voted Mr. James Walker, of Indiana, whose picture is herewith shown, the handsomest member of the association present and in announcing their decision, presented Mr. Walker with a handsome bouquet of roses.

The various subjects for consideration



MR. JAMES WALKER, WINNER OF THE AMERICAN BLACKSMITH COMPLIMENTARY PRIZE.

and discussion were thoroughly covered, the greatest interest being shown on all topics presented to the convention.

A few of the various interesting reports are here given:

Spring Making, Repairing and Tempering.

We have considered the subject well, and are of the opinion that the best method of making springs is by machinery as they are made by the factories, where they, as a rule, do the work well, and they must do it at a reasonable expense for they are in the business for what money they can make out of it. We are making springs on the spring factory plan, that is by machinery, so that we are not required to have all-round spring-makers. We have no one here that ever worked in a spring shop before he came here, the men being from 18 to 25 years old. There is nothing about spring-making with machinery that a smart, intelligent young man can not learn in a short time; with older spring-makers they assume to dictate as to how a spring should be made, because they think they know something more about them than we do. As a rule, we are required to

make springs to a blue print, so designing on our part is not required. If we were required to design them there is but one rule laid down and that is that $\frac{1}{4}$ of the number of plates in a spring are to be principles, or a fraction less will do if they do not divide right, the remainder to be graduated between them and the band. With this rule it does not require an all-around spring-maker to lay out a spring; it could be learned at school instead of at a regular spring shop.

In regard to material used for making springs, we are of the opinion that a spring made of good crucible steel is better and will wear longer than one made of openhearth, or some other inferior grade, but we have but little to say on that subject as we are required to use such steel as is furnished us. They tell us that it is the same as the spring factories use, and that they as a rule make good springs. We have but little trouble with new springs standing the required test. We sometimes get steel that will not take temper. This the fitters will detect at once and it does not therefore get into the springs.

Now in regard to fitting and tempering, we use rolls to fit the plates before cooling them. The rolls are made convenient and handy, and very readily used so that the plates do not require any reheat before cooling—as we have heard argued on the floor of our convention—as necessary to a good job because there would “be three or four black blotches on it before it was ready to cool.” After cooling, the temper is drawn in the usual way, then the fitting is done on a table for that purpose; the helper drawing the temper while the spring-maker is doing the fitting at the same time. The next course of plates are in the furnace to be ready when he has the other ones all fitted. We fit a number of springs at one time. If a springmaker is given a set of coach springs to fit up and temper, he starts them all at once—32 springs or parts of springs that will go forward at the same time. Each section gets a plate in its turn; there are then 32 plates in the furnace which will all be hot as fast as they can be used.

In regard to tempering springs, we have used several kinds of baths, water with several different ingredients in it, raw linseed oil, fish oil, lard oil, Standard oil compound and Standard tempering oil. We have adopted the Standard tempering oil, it being the cheapest, as we have found no perceptible difference in them except the water, where we would frequently find cracked plates. The springs are all given the same test. We

think it severe enough, as they must double the amount of the load they are required to carry when in service, which in most cases requires them to be crowded entirely straight in order to get the test, or in some cases even more. In fact, in testing a bolster or elliptic spring, when we do get them a trifle below straight, they must come back within one-eighth of one inch of the original set of the spring.

We have a spring plant with a capacity of 45 tons of new plate spring per week. This may appear a large amount for one railroad to use. We have 8,420 miles of road; we make all and repair all for the entire system, which controls about 2,000 engines and 1,692 coaches, baggage and way cars, all using these plate springs.

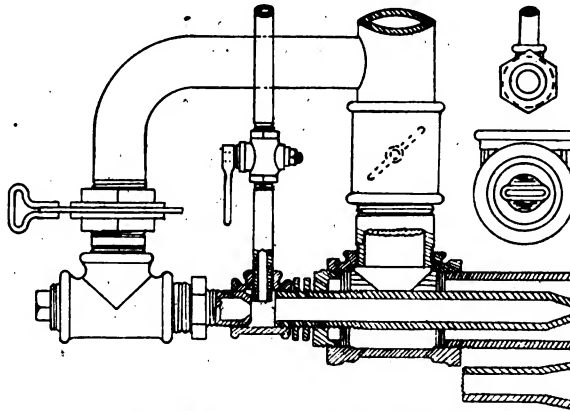
Our spring plant consists of a building 52 by 102 feet, in which we have a small stationary engine and a pump to furnish the hydraulic power pressure—700 pounds per square inch. We have other tools as follows: One punch and shear, two tapering rolls, one nibber, one clipper, six fitting rolls and tables, one clamper with a total hydraulic pressure of about fifteen and one-half tons, one bander with a total pressure of about 89 tons, also a testing machine with a total pressure of about twenty-seven and one-half tons, and also one eye and wrapper machine. We have one large furnace 5 by 24 feet, inside measurement, which is heated with oil by four burners, two at each end, and which keeps the heat equal all over, from which all the fitters—six—work, each gang having two doors; also one furnace for the tapering rolls and one that is used for the punch, nibber, eye and wrapper machines; also one small furnace for heating bands for putting them on all heated with oil.

In regard to repairing springs, we repair for the entire system, using old steel so far as it is possible. In cases where we cannot get old steel long enough we have to use new. We do not think it is good practice to use new steel in old springs for it will necessarily be thrown away with the remainder of the spring in a short time. If the springs are too low in set they are reset and retempered as when new. If the set is all right and has not more than three broken plates, those plates would be put in without resetting the whole spring. In some cases where a spring has become a trifle low, especially on coaches or other places where bolsters are used, we set them up higher without reheating and retempering.

Now in regard to tempering bath; we use an oblong tank, five feet long,

twenty inches wide and four feet deep, holding three barrels of oil. This tank is placed in a box of water with about six inches of space on all sides of the tank to keep the oil as cool as possible. Whether this cooling off of the plates does any good or not we are unable to say. Some think that it does not harden. Our experience is that the fitter is unable to fit them unless they have been reheated sufficient to burn off the oil, and it is generally understood that that is the requisite heat required to give it the desired spring temper. We have had but little experimenting further than giving the springs the required test.

We make our spring bands with steam hammer. We make the iron also. They all have heavy crowns. They are bent, welded and finished with the hammer, except bolster bands, and they are squared up with hammer, after



SECTIONAL VIEW OF LOW PRESSURE OIL BURNER.

welding. We also weld all pads on the main plate, trim, finish and punch slot when required, while hot, with hammer. We have a hammer located for that purpose, and a furnace also to heat them, which is fired with coal. It is built on the reverberatory plan. This, however, may be done with oil or gas, but we use coal as a matter of economy.

JAMES WALKER, H. R. LOOKER.

Oil Furnaces and Burners.

I have two furnaces for welding flues, four for bolts, four Bradley hammers, and one furnace for large forgings. For all my furnaces we use J. Burns' oil burners, one in each furnace. In large furnaces we use two J. Burns' burners, and one of our own make.

Much better results can be obtained from oil than from coal, and the furnace is more quickly prepared. It is cleaner to work at, as there is neither coal nor ashes to handle, hence a cleaner and better heat is the result. On the whole, you will find it a simple operation. The brick in the furnace will last eight months. With coal the furnace will last three months, while with oil we can do from 25 to 100% more work than with coal.

I have a burner for welding locomotive iron frames. I welded one that has been in service nine months, one seven, one six, one five, and one steel frame three months in service. I feed the oil by gravity, strain the oil and get 90 lbs. air. Build a good furnace and you can weld frames and you can get good results.

JOSEPH NORTHEED.

Formers for Forging Machines.

The production of forgings by formers and dies is one of the most important subjects in the modern blacksmith shop today.

In designing and making dies and formers for bulldozers, and upsetting machines, two chief points are to be considered,—first, the forging, or article to be made, and secondly, the number required. If only a small quantity is wanted, the dies should be gotten up to suit the amount, and as cheaply as possible; if, on the other hand, you have an unlimited number to make, too much care cannot be exercised in the making of the dies, in order that they may be accurate, as you will find it very difficult to make good forgings with badly constructed dies.

The wearing parts of dies and formers should be made of the best material obtainable. Cast iron is very suitable for a great variety of dies, with cast-steel parts set in where there is any wear or friction. Dies are often made too complicated on account of wanting to do too much at one revolution of the machine,—an extra stroke does not take very long, and often improves the forging materially. We all know that it is very nice to say this was made with one stroke of the machine, when two might improve and simplify the making of the former or die for the same, provided it can be made with the same heat.

D. B. SWINTON.

Repairing Locomotive Frames.

There is no question but that frames can be repaired satisfactorily if you have the proper facilities to handle them; workmen capable of taking good heats and shaping them properly. Some men are in favor of a "V" weld, more favor the "He-and-She" way of scarfing; all favor getting the grain of the iron running in the same direction with the frame bars; but it will make no difference how you shape all those parts if you have not good coal and a good man behind the anvil, who is capable of taking a good heat and working it properly.

In repairing heavy frames broken toward center, it would be well to have two cranes conveniently located so they would swing together, each crane bearing one-half the weight. If these are not handy, bails such as shown in proceedings of 1902, page 86, and proceedings

of 1904, page 75, would fill the bill. In some cases of broken frames, a foreman will have entirely new parts applied. Now, unless the broken part shows that it is too weak for the work required, this should not be done, as the old parts can be put back in good shape and avoid all machine work as shown in our blueprint. Again we find a good many men claiming to weld frames without taking them from the locomotives. Of course experience teaches that a frame broken in the back-bone and taken to a blacksmith shop would require four good helpers and good heating to put the

welding of steel frames, that has been done on the Pennsylvania Railroad. Probably some of the members present from that road could give us some information on that subject.

We have here a sketch of a frame for a large compound Atlantic type passenger engine. Two feet were completely broken out of the back-bone, and brace broken in two. This was caused by a tire bursting and the wheel center being crushed, letting frame down hard, breaking it in the middle. We repaired this by straightening frame, then backing up broken ends for V's, made new piece for

vicinity now for thirty years. I do all kinds of work; shoeing, repairing, etc. The picture only shows the main part of the smith shop. My wagon and wood department is at one end. I have in operation a 2½-horsepower Watkins gas engine, and an Easy trip hammer (Mayer Bros., Mankato, Minn.) I blow two fires, and have ventilation fan, band saw, emery wheel, drill press hammer and will put in a lathe very soon. I am in favor of power in the shop, as it makes work easy and enables you to do it quicker and better. My engine



AN OHIO SHOP, WELL EQUIPPED FOR GENERAL REPAIRING AND BLACKSMITHING.

"V's" where they belong. It would seem that this would be a rather hard proposition to repair properly without taking the frame from the locomotive.

In regard to repairing steel frames: We have the opinion of a man whose road at present is using more steel frames than iron frames. He takes the broken parts and reinforces them with iron. After this is done, and they are properly scarfed, he welds in iron "V's." He has tried the "He-and-She" welds, also the "V" welds without the iron reinforcement, but he did not get the good results that came from the iron splicing according to the blue print.

We have here an article taken from "The Railway & Engineering Review," in regard to what is called "Thermit"

back-bone, clamped all together, put V in brace first, then V's in back-bone. This engine has been making 260 miles per day on a heavy fast passenger run, and frame is carrying her all right, showing that if good work is done, results will be satisfactory.

DANIEL FITZGERALD, Chairman.

A Well Equipped Ohio Shop.

A. M. SPEER.

The picture herewith shows my shop, 40 by 46 feet, situated in Jewett, Ohio, eight miles from the county seat, Cadis. It is a town of 1,200 population, on the Wabash, Wheeling & Lake Erie. R. R., and the P. C. & S. T. R. R. I learned my trade four miles from this place and have worked at the craft in this

costs me ten cents for a 10-hour run.

I have a well with pump at slack tub with a wastepipe to prevent it from overflowing. I cool all of my tires in this tub, and as I have an upsetter at the fire, it does away with all extra running around. I set my wheel trestle so I can turn a wheel up on the tub. I have a pulley and hook to lift heavy tires and carry them from the fire to the wheels without lifting them by hand. I weld the tire and most everything on the trip hammer, and I can also weld nail rods with it. I find it a very handy machine.

The following are some of my prices:
Horseshoeing, plain \$1.20

Horseshoeing, toed.....	\$1.40
Resetting shoes, plain.....	.50
Resetting shoes, toed.....	.70
Setting axle.....	1.00
Welding springs, per weld.....	.25
Wagon tongue.....	\$1.50 and \$2.00
Wagon hounds, front.....	3.50
Wagon hounds, hind.....	2.50
Axles,.....	\$2.00 and \$3.00
Buggy shaft.....	1.00
Buggy spindles, new.....	5.00
Setting tires.....	50c. to \$1.00
Singletrees, per pair....	\$1.00 to \$2.00
Filling wheels.....	3.00
Spokes, new.....	1.50
Rims, new.....	1.50
New tires, per pound.....	.03
Making new tires.....	1.00

I run my shop on the cash basis, as I find after thirty years' experience that it does not pay to run accounts. I know that if all the blacksmiths would unite and keep up the prices it would be better for all.

A New York State Shop.

JAMES E. DOLAN.

The photograph shown here gives a view of my shop at Geneseo, N. Y., 28 by 40 feet. We do very little repair work, but a great deal of horseshoeing.



A WELL-LIGHTED SHOP OF GENESEO, N. Y.

I run two fires with a Royal Blower and employ three men. We run as high as 550 shoes a week, receiving from \$1.00 to \$1.80 per set. We make all the hunting shoes and most of the road shoes by hand and carry from 4,000 to

5,000 shoes every spring for a starter, and then I always have to buy more through the summer.

Our shop is well lighted, as we have four sky-lights, numerous side windows and six electric lights. I am very much interested in THE AMERICAN BLACKSMITH and enjoy the articles on horseshoeing. I have worked in Geneseo ever since 1859, excepting the time I was in the War of the Rebellion.

A Blacksmith Shop of Pennsylvania.

HORACE D. HOVIS.

The four views herewith are of my shop, situated at Waterford, Pa. The work which I do comes under the head of custom blacksmithing. I do some new work of different kinds; repairing of farm and mill machinery, horseshoeing, saw gumming, emery grinding, wood turning, sawing, etc. I also carry a line of gas pipe and fittings, and cut pipe to measure, some machinery supplies, iron tires and bolts. I have an

they are a great saving over steam in the class of work which I do. The arrangement of the tools can be noted in the photographs, with the exception



SHOEING FLOOR AND FORGE OF PENNSYLVANIA SHOP.

of the water supply, which consists of a driven well, seventeen feet deep, of pure, cold water about half soft and suitable for all purposes.

My blacksmith and machine shop is 34 by 48 feet and two stories high. I also have an iron and coal room in the rear, 16 by 24 feet, and another building at the left and rear, 32 by 50, which I have fitted up with stalls to accommodate fourteen horses with feed and water and shelter in cold and wet weather, and by this arrangement I do not have to have my shoeing floor crowded at any time.

I learned my trade in Erie, Pa., with my father and have worked in a number of cities of Nebraska and Ohio, working in all thirty-seven years.

A Rambling Talk on Welding.

Funk & Wagnall's Standard Dictionary gives the following definition of the word weld: To unite, as heated metal, in one piece or mass under the hammer or by pressure; consolidate, as separate masses, into one," and then proceeds to say:

"Metals are weldable in proportion to the length of time they will stand under heat in a plastic condition without melting. Steel welds at a lower temperature than iron. The process usually consists in bringing in a tapered end of each piece to a white heat, fluxing them with a welding powder, and then closing or shutting the surfaces with hammers on an anvil. In pipe welding, a skelp or iron plate is formed into a tube by joining the edges, and drawing at white heat through a pair of bell-mouthed jaws. In electric welding, two ends may

be pressed together while heated by an electric current to the welding point, the heat being concentrated at the seam by the great resistance there. Horn may be welded by joining the parts, incased in wet linen cloth, or immersed in hot water, and bringing their lapped edges

on Forge Practice, says, "Sal ammoniac mixed with borax seems to clean the surface better than borax alone. A flux made of one part of sal ammoniac and four parts borax works well, particularly when welding tool steel, and is a little better than borax alone."

Of much importance also is the proper scarfing of the pieces. As has already been pointed out in the columns of THE AMERICAN BLACKSMITH, the face of each scarf should be never concave, but rather convex, on the principle that the convexity of each piece will tend to push dirt and scale out of the weld.

The perfect weld is one where the welded section becomes as the original bar. This we may believe is rarely the case. A certain temperature or fluidity is necessary for proper junction,

and hence if a portion of the scarf cools below this temperature, or if scale or dirt interferes, the weld is imperfect at that point. Repeated tests show that welds cannot be relied upon to give equal strength with the original piece. The strength, of course, depends upon how much is perfectly united. If only half the cross-section is completely welded the strength will be but one half. A source of great weakness is the tip of a scarf that has failed to "stick." The break, when it occurs, is more likely to start at such a point. It should be remembered, however, that many poor welds appear on the outside to be perfect. Hence in all welding, and especially in cases where much depends upon the welded piece, the greatest care should be taken to have all conditions as near perfect as possible. The section of the piece at the weld should be increased

and not lessened, as sometimes happens in scarfing. The scarfs should be carefully formed, and the fire carefully made; in fact, no part of the operation can be neglected. Since small

thin parts lose their heat most quickly it is important to see that the tips of the scarf are stuck first of all.

In Kent's Mechanical Engineer's Handbook are reported various tests to determine the ratio of the strength of the weld to that of the solid bar. In twenty-eight tests of iron tie bars the weld varied in strength from 37 to 79 per cent. of the original bar. In seven tests of iron plates the ratio of welded strength was from 58 to 84 per cent. In 216 tests of chain links it varied from 72 to 95. In 17 electric welded bars the average ratio was 89.1%, as against 89.3% in the case of 19 hand welded bars. Fourteen tests of steel bars and plates gave ratios from 53 to 82. Commenting on these tests it states, "The ratio of weld to solid in all the tests ranging from 37 to 95, is proof of the great variation of workmanship in welding."

Thus it will be seen that the most vital point about welding is the knowledge, skill and carefulness of the man who does it. Important welds



VIEW OF MACHINE ROOM IN PENNSYLVANIA SHOP.

under the pressure of heated plates of iron. Graphite and coal may be welded by pressure alone."

A consideration of the nature of welding leads us to say that the nearer the two surfaces approach fluidity and the less the presence of foreign elements, the more perfect will be the weld. Such a condition is difficult of attainment in actual practice. A "dirty" fire is the first thing the blacksmith avoids when heating for a weld. Hot iron exposed to oxygen or air rapidly forms a scaly oxide upon its surface, which requires a higher temperature to fuse than does the iron itself. Compounds are useful for the double purpose of preventing access of air to the hot surface and of acting



THE BLACKSMITH SHOP OF MR. HOVIS, EXTERIOR VIEW.

should never be left to an unskilled helper.

Diseases of the Foot—Causes, Symptoms and Treatment—2.

W. O. JULIUS.
Calk Wounds.

In continuing the articles on diseases of the foot, we will start with calk wounds. Horses wearing shoes with sharp calks are liable to wounds of the coronary region, from trampling on themselves. These injuries are most liable to heavy draft horses, especially on rough roads and slippery streets. The fore feet are more liable than the hind ones, and the seat of injury is commonly on the quarters. The wound in the hind foot results more frequently from the animal resting the heel of one foot directly over the front of the other. In these cases the injury is generally close to the horn, involving the coronary band, the sensitive laminae, the extensor tendon, and even the coffinbone.



VIEW SHOWING FORGES OF PENNSYLVANIA SHOP.

to render fluid such oxides as do form. Many smiths scorn the use of welding compounds with iron, but nevertheless their effect is undoubtedly beneficial.

Mr. John L. Bacon, in his new book

In treating this trouble boots to protect the coronet of the hind foot are recommended, and the use of a blunt calk on the outside heel of the fore shoe is to be included in the treatment, as this is generally the cause of the injury.

If the wound is not deep, and the soreness but slight, cold-water bandages and a light dressing are all that is needed, but where the injury is deep, cold, astringent baths, made by adding two ounces of sulphate of iron to one gallon of water, should be used, followed by poultices to hasten cleansing.

Frostbites.

About the only parts of the horse liable to frostbites are the ears, the feet and legs. In slight cases the skin becomes pale and bloodless, followed by intense redness, heat, pain and swelling. The hair may fall out and the skin peel off, but the inflammation soon subsides and the swelling disappears. In more severe cases, patches of skin are destroyed and after a few days peel off, leaving slow-healing ulcers.

Treat simple frost bites by cold applications followed by applications of a five per cent. solution of carbolized oil, but when portions of the skin are destroyed, their early separation should be hastened by warm poultices.

Canker.

Canker of the foot is due to the rapid reproduction of a vegetable parasite, which not only destroys the sole and frog, but by setting up an inflammation in the deeper tissues prevents the growth of a healthy horn, by which the injury might be repaired. The class more often affected by this trouble are heavy cart horses.

The cause of canker is dampness, which seems to be indispensable to the existence and growth of the parasite. The disease is very rarely seen in high, dry districts.

Canker is usually confined to one foot, but it may attack two, three, or all of the feet at once. When the disease follows an injury which has exposed the soft tissues of the foot, the wound shows no tendency to heal, but instead, there is a profuse, thin watery discharge from the injured parts. This gradually undermines and destroys the surrounding horn, until a large part of the sole and frog is diseased. The living tissues are swollen, dark colored, and covered at certain points with particles of new, soft yellowish horn.

When the disease originates independently of an injury, the first evidences of the trouble are the offensive

odor of the foot, the liquid secretion and the rotting away of the horn of the frog and sole. In the earlier stages of the disease there is no interference with locomotion, but later the foot becomes sensitive, and finally the lameness is severe.

In treating canker, first clean the foot with warm baths and apply a poultice containing powdered charcoal, which will destroy much of the offensive odor. The diseased portions of the horn should be carefully removed with sharp instruments, until the affected parts are bordered by healthy horn. The sound horn should be pared thin on the edges and with a sharp scissors all the prominent points on the soft tissues cut off. Shorten the walls of the foot, and nail on a broad, plain shoe. The foot is now

it until the heels rest upon the sole, also becomes a direct cause of corns.

A corn usually induces sufficient pain to cause lameness but it may be intense, or it may be but a slight soreness.

If a corn is suspected, the foot should be examined for increased sensibility of the inside heel. Tap the heel of the shoe with a hammer and grasp the wall and bar between the jaws of pincers, which will cause more or less flinching if the disease is present.

In the treatment of corns, as in all other troubles, the cause should be discovered and removed, which in the great majority of cases will be found to be the shoeing. For a sound foot perfectly formed, a flat shoe, with heels thicker than the toe and resting evenly on the wall proper, is the best, but in



INTERIOR VIEW OF A CANADIAN SHOP.

ready for dressing and any of the stimulating and drying remedies may be used. The use of each one of these remedies may be necessary before a complete cure is effected.

Corns.

Corns are injuries to the living horn of the foot and involve the soft tissues beneath, rupturing the capillary blood vessels, from which a small amount of blood escapes, staining the horn in the immediate neighborhood to a dark color.

The fore feet are most subject to the disease because they support a greater part of the body and because the heels of the fore feet are first placed upon the ground when the animal is in motion.

The causes of corns are high heels, contracted heels and long and weak feet. One of the most prolific causes are errors in shoeing. A shoe that has been on so long that the hoof has overgrown

flat feet it is often necessary to concave the shoe as much as possible on the upper surface, so that the sole may not be pressed upon. If the heels are very low the heels of the shoe may be made thicker, and if the foot is very broad a bar shoe resting upon the frog will aid to prevent excessive tension upon the soft tissues when the foot receives the weight of the body. A leather pad put between the foot and the shoe will help very materially in destroying concussion. A flaxseed meal foot packing, wet clay, or damp dirt floors, bedding of tanbark, or greasy hoof ointments, are all means which may be used to keep the feet from becoming too dry and hard, and to maintain the suppleness of the hoof.

(To be continued.)

A Canadian Shop.

WM. G. MONTGOMERY.

The engraving shown herewith is a view of the inside of my shop, which is 24

by 24 feet, and the workshop is 16 by 42 feet. I have an Ideal gasoline engine of 6 horse power, a Little Giant hammer, a polisher, circular saws, a power blower, a wood turning lathe, emery wheels and a power drill. I got the engine and hammer last spring. Up to then I used a horse, but it became too tame for me. I am well pleased with my outfit, and think it pays to have power in the smith shop both for quantity and quality of work turned out and the saving on the smith is surprising.

I employ one smith steady and also have a woodworker. I think a man cannot be good at both iron and wood. Iron is enough for me. At this time of the year I repair threshing engines, and I find it profitable work. I will write later and tell some of my ways of doing work and perhaps some brother smith will profit by it, as I have done by what others have written.

A Short Talk on Blacksmithing and Drop Forging.

Being Extracts From a World's Fair Pamphlet of J. H. Williams & Co., of Brooklyn.

Whether it be a Biblical or mythological tradition, the blacksmith remains today an honorable factor in mechanical arts. Tubal Cain is enrolled among the nobles as a "hammerer and artificer" in every work of brass or iron. That there is little or nothing of record in the liberal arts concerning this masonically much-respected craftsman, seems strange.

Moving along several thousand years King Solomon, according to Jewish legend, made much of the smith who furnished the tools to the builders of the Temple at Jerusalem and ignoring the disgruntled artisans, gave him "the seat of honor on the right." The celebrated painting "King Solomon and the Ironworker" was doubtless inspired by this story of the blacksmith.

The primitive South African methods discovered by Henry M. Stanley are interesting. A small mound of clay as forge, the skin of an animal in bag-shape attached to wooden tuyere pipes as bellows and a large flat stone as an anvil, before which the smith squats, are means in the development of very shapely and effective instruments of war, etc.

Elihu Burritt, born 1810, the celebrated American scholar and reformer, was known as "The Learned Blacksmith." A successful smith, master of many languages acquired "between heats," advocate of temperance and abolition of slavery and successively editor of the *Christian Citizen* and publisher of "Sparks from the Anvil," he

became a figure in the history of a trade commanding enduring respect.

The present day esteem of the "good old craft" is pleasantly borne by the Rev. Robert Collyer (New York). Shortly after the Chicago fire "The Reverend Yorkshire Blacksmith" forged a horse shoe for the benefit of its sufferers for which the students of Cornell College paid in subscriptions more than two thousand dollars.

Drop-forging can scarcely reach the same measure of "Hall of Fame" regard accorded the smithy's art, but the benefits to the machinery world alone will always command for it a respectful share of commercial, if not historical, distinction among the mechanical arts.

That drop-forging is simply the "squashing" of heated metals into die forms, is wrong. That one blow of the ram or hammer of drop is sufficient to form a forging is common but faulty belief; a dozen blows are common, indeed. The process of drop-forging is always an expensive but superior one.

The anvil and not infallible eye of the blacksmith are, in drop-forging, superseded by ingeniously hand cut dies in which the hammer man directs the force and number of blows required to form a product of exact dimensions. Duplicates, in unlimited quantities, which by hand methods would be impracticable because of their intricacy, are successfully manufactured by drop-forging. The success of much manufacturing, power and automatic machinery is due to this particular portion of the art of machine-blacksmithing—an American institution which is little more than fifty years old.

Drop-forgings are made in dies which are in two parts. One part is fastened in the ram or hammer itself, which moves vertically between two uprights or guides and is raised by means of friction rolls controlled by the operator; the other part is fixed in the anvil or base of the hammer. The ram rises until released, when it falls instantly, striking with the upper die the heated bar of metal placed on the bottom die and forcing it into impressions in both dies. By a series of such blows the completed article is formed. The necessary dies are made from a drawing or model, preferably the latter, as it facilitates designing the dies and frequently permits our quoting lower prices than could be given from a drawing. We must know whether drawing or model shows finished or forging size; if finished size, we need also to know the allowance desired in machining. It is usual to add $\frac{1}{8}$ inch on each surface

to be machined unless the piece is to be finished by grinding or polishing only, in which case $\frac{1}{16}$ inch is allowed; surfaces not to be machined or ground are made close to size. Forgings vary slightly in thickness—say from $\frac{1}{16}$ inch to $\frac{1}{2}$ inch—depending on their shape and the material used. They can, however, be made to gauge by a restriking operation; this often requires separate dies and entails additional expense. In addition to forging dies the cost and endurance of which vary with the work required of them, trimming dies are necessary to remove the surplus metal thrown out between the forging dies in working.

Method of Making Socket Wrenches.

NELS PETERSON.

Some time ago several methods of making socket wrenches were described in THE AMERICAN BLACKSMITH. In the sketch is shown an original method. The stock is forged out of mild steel to



METHOD OF MAKING A SOCKET WRENCH.

shape, as shown, and is then center punched, drilled to a suitable depth, according to the size of the bolt and reamed out with a large bit to form the socket. The last step is to heat and square it up over a mandrel to fit the nut that it is intended to be used for.

Jottings About "Shorty."

C. E. S.

"Shorty" is a blacksmith, an all around good one, and, like many of the trade, has a weakness, not the common weakness, however, that afflicts so many of the craft. But I'll tell you about his weakness.

"Shorty" takes two "trade papers," and borrows as many others as he can, and his weakness is in trying the many experiments and the various ways of doing things which he sees mentioned and illustrated in these magazines.

"Shorty" gets intensely interested in any new idea he reads about, and is determined to try it at the first opportunity; often he cannot wait for an opportunity, but leaves right off in the midst of his regular work to try an experiment, or work out an idea. He works in a large manufactory, but has a little shop of his own at home where he often works evenings, Sundays and holidays.

"Shorty" is poor, always will be, probably, for trying so many experiments is expensive. He often has to buy material just for these experiments, and his little shop is full of finished and

partly finished specimens of his handiwork. Of course these things, most of them anyway, are of no earthly use to him or anybody else; but, just think of the sweet satisfaction he has had working them out.

"Shorty" reads everything from cover to cover, and often sees statements which conflict with his ideas, and there's the trouble. He can't rest easy until he has tried the experiment and found whether the other fellow is wrong or not. Although he is a good mechanic, he is not very comprehensive and has to try many things before he can see through and understand them.

All of these trade papers have many

page of the magazine containing it, and you will have a valuable book of reference and can tell at a glance just where to look for the article without hunting over a big pile of books, and if you haven't it you will know just what number to order of the publisher.

This is better than being a "Shorty."

A Minnesota Smith Shop.

The shop which is shown herewith is that of Mr. Peter Schmitz, of Alma City, Minn. The building is 20 by 40 feet, and two stories high, with an engine room 14 by 20 feet. The shop is equipped with two fires, emery stand, trip hammer, tire upsetter, taps for

Then find what grade of steel and what percentage of carbon is best suited for the work, and last but not least, know how to work your piece.

Too many smiths fail to study their work and of course experience many failures. It stands to reason that a piece of high carbon steel, say 1½ per cent., cannot be worked the same as a piece containing but one per cent. of carbon.

In working high carbon steel, care must be taken so as not to overheat and burn it, this is very easily done and only men skilled in manipulating steel can be relied upon to get the best results from it. But when this grade of steel is prop-



INTERIOR OF A MINNESOTA SHOP.

good things in them, and should be read by the progressive mechanic or he will unconsciously get left behind his fellow-workman who does, and he will "wonder why." It is well to read these interesting articles over until they are clearly understood, for there may be some meaning you didn't catch at the first or even the second reading.

Now, this experimenting is all right for those who can afford it, but for "Shorty" and others who cannot, I will offer the following suggestions.

Buy a small blank book, and when you see an article bearing on something that interests you, or you think may help you out at some future time, just note it down, with a few points concerning it, the name, volume, number and

boilers from ¼ to 2 inches, taps for set screws from ¼ to ¾, together with other tools of all kinds. Mr. Schmitz built his shop in 1893, and says he is doing a good business, his work being principally that of repairs and shoeing. With regard to the cash and credit basis, he states that he trusts everybody and has not lost \$15.00 in the 15 years that he has run a general repair shop.

A Few Hints for the Everyday Smith

F. G. CLARK.

We will start with a little talk on steel, which, to the average smith, is a hard proposition. In the first place understand what you want your steel to do; is it to be used for cutting, stamping or must it stand hammering or pounding?

erly treated it will do more than twice the work of ordinary tool steel, when working metals of extreme hardness.

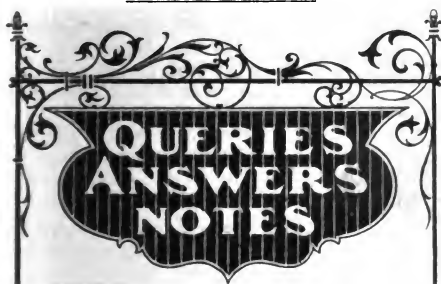
In hardening steel for ordinary purposes, water will be found to meet most requirements, but for fine tools and unusual shapes, the various oils and solutions are of advantage.

The more common causes of trouble when hardening steel are: heating too slowly or too rapidly, heating too hot and heating the metal unevenly.

The smith may think that to work steel properly, requires a professional; so it does, but in working the metal in the everyday smith shop, a little common sense and carefulness will usually go a long way in treating steel successfully.

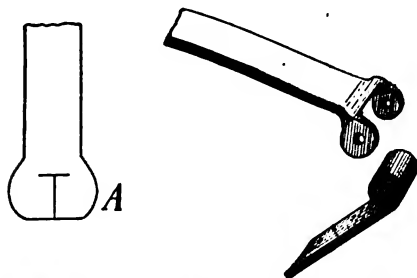
Many smiths experience difficulty in

welding tires properly and numerous are the methods used by various smiths. The proper way to weld a tire to give satisfaction and to insure strength, is to scarf the ends and then spring the tire, by pulling the end that is to lay on top toward the floor, resting the other end on the anvil. This will cause the two ends to press firmly against each other when placed in position for welding. Now, having a good clear fire, heat the ends to a low heat and lap each side to prevent slipping sideways. Then heat to a welding heat, using sand only for a welding compound, and place the tire on the anvil and proceed to weld as follows: Strike over the lower end of tire, then weld the upper end and when these ends are welded, proceed with the rest in the usual way, hammering the weld down a little narrower than the other parts of the tire. Of course in finishing, the weld joint should be made to look as near as possible like the other part of the tire, showing no seam whatever.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Elliptic Spring Joint.—In answer to Mr. Carter's question as to how to make the joint of an elliptic spring, I would say, take a piece of spring steel, upset it and make a 'T' cut as shown at A, then take each half and twist them at right angles to the main piece, forge to shape and punch holes to admit



METHOD OF MAKING AN ELLIPTIC SPRING JOINT.

bolt. The other part of joint is very simple to make, but care must be exercised with both pieces so as not to burn your steel or to work it too cold. The sketches shown herewith will give a better idea as to the method of making the joint. R. TRAY.

Repairing an Auger.—As to S. A. Carter's query in the August number, he doesn't tell his brother craftsmen what kind of an auger he means. If it is a wood auger and

the starting screw has broken off, he had better throw the auger on the scrap pile. If it is a drill he wishes to repair then he should flatten the end where it has broken off and twist it once around, file to a point and then temper. A. COLE.

Plow Lays.—In regard to Jacob Vorner's inquiry as to welding plow lays, I would say, if the ability to do this work was acquired by being told, I think the farmers would make their own. See that your fire is clean. Use plenty of borax mixed with cuttings from drill press and screw plate, and your eyes will have to do the rest. Experience must be your teacher. When they are properly heated plow lays weld as easily as anything else. W. J. ZIEGLER.

Shoeing a Forger.—I take a common front shoe and weld a toe clear across between the first and second nail holes. Fit the same as an ordinary shoe, a little lighter behind, but as usual with all calks or none. I find that this shoe beats all the toe weights (rolling or otherwise) for ordinary horses. Leave the toe a little lower than the heels on the front shoe. W. J. ZIEGLER.

An Overhead Bellows.—In answer to William Lane's question, how to hang a bellows overhead, will say I have seen many hung overhead and cannot understand why his does not work, unless he has too many angles or elbows in his piping. If he just raised his bellows above the place he had it before, attached a rope or light chain to the handle and put in good tight fitting piping with fewest possible elbows, I cannot see where he should have trouble. Perhaps the piping or bellows leaks. But my advice to him would be rather to get a blower at the first chance. W. ALBERT.

A Strong Testimonial.—THE AMERICAN BLACKSMITH is one of the best books I ever saw for a blacksmith. I don't see how I could get along without it. If I had time I would write and tell brother blacksmiths of some of my troubles in the past eighteen years. I try to get every blacksmith not already taking the book, to subscribe for it, and tell them how much it will help them. If I had taken a paper like that when I first went to the forge I would have finished my apprenticeship in about half the time it took without it. E. L. BRAXTON.

Success and Shoeing Stocks.—I think we ought to stick closer together if we make our trade a success. There are too many who think by doing cheap work they can get more. They are mistaken; the better work you do the more work you will always get to do. Do good work and charge a reasonable price. I want to ask some of the craftsmen who have tried shoeing stocks, which is the best kind to get. As to THE AMERICAN BLACKSMITH, I am very much pleased with it and don't think I could get along without it. S. S. TRUITT.

Pennsylvania Prices.—The prices here run as follows:

Four new shoes	\$1.25
Resetting four shoes .....	.60
Four old shoes .....	.80
Setting tires from $\frac{1}{2}$ up to $1\frac{1}{2}$, one set.	2.00
New buggy tires $\frac{1}{2}$ by 1 inch or $\frac{3}{4}$ by $\frac{1}{2}$ inch	5.00
One horse spring wagon tire, per set.	7.00
New axles	5.50 up

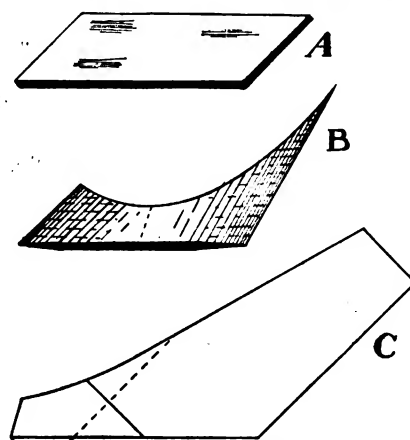
This is all I have to say this time. I will write again. JACOB BERGER.

How to Build a Forge Pan.—Sometime ago I noticed a statement of a brother smith asking how to build a forge pan or fire box, saying that he had to rebuild his once or twice a month. You may know how strange this sounded to me, since the fact that I built one fire box over six years ago and another four years ago and both of them are still in use. I simply use the subsoil we have in

this country mixed with a little common sand. Plaster about two inches thick over a common brick fire box, let it stand until it is nearly dry, then build smithing fire and go to work, being careful of course, until it is seasoned by the fire. WALTER MCCOY.

Shoeing Opinions.—There have been a great many different opinions in this town as to shoeing with high heels and no toe for cocked ankle and knee-sprung horses; also for sore tendons and sore cords, I claim that if a horse is shod with high heels and no toe it will ease him for the time being, but make him worse in the end, as it will have a tendency to shorten or contract his tendons. I should like to hear from E. W. Perrin, John W. Adams, D. L. Corbin or any other good authority as to this matter. What do you say, brothers? A. L. Bessert.

Repointing Plows.—Mr. Killgore gives a method of repointing turning plows. I will give mine, which I think is superior, as I have tried both. Take a piece of plow steel $1\frac{1}{2}$ by $\frac{1}{2}$ inches and cut it as shown at A, four five or six inches long, according to size of



A METHOD OF REPOINTING PLOWS.

plow to be pointed. Draw it sharp on diagonal edges and shape as at B and bend at dotted line. C shows plow after it is bent and driven on. Try this method and you will find it the most successful way. You can draw the throat out at each sharpening and still leave a well shaped point. The sketch will make this clear. J. G. LOWRY.

Pointing Plows.—It seems to me W. P. Killgore's article in regard to pointing plows is composed of a great many words. My plan or way is to cut the point out of an old rasp and draw to a sharp edge and bend it. Place it over point of share and weld, first sharpening cutting edge of point to be welded. I save drawing it out after welding. Hold for first heat with common tongs or make long lipped tongs to catch from back of share on top. For shares that are worn off, weld on a piece of iron to give stock so as to fill up and give original slope to length of share. W. J. ZIEGLER.

Upsetting Steel.—In reply to Mr. Fred. Rickert, I will simply say I was giving my way of steeling and tempering axes and not augers and hammers. From his writing I concluded that all the blacksmith work he ever did was upsetting steel for drills. I know from experience that a drill which has to be upset will not stand as well as if the steel was of the proper size. In my letter in the June Number of THE AMERICAN BLACKSMITH, the last words should have read "will stand any kind of timber" instead of "any kind of temper." I should like this subject of upsetting steel taken up and discussed by blacksmiths of experience. What does Mr. Markham say? H. L. KIBLER.

Durability of Iron and Steel.—In answer to Mr. Hanson's questions in the August

paper, I will say that the life of this galvanized pipe depends upon the nature of the ground in which it stands, also the thickness of material the pipe is made of. If the soil in which the pipe stands is salty, the pipe will corrode quickly. As to which will rust the fastest, iron or mild steel, I say the iron will and the steel will stand the weather better. The making of an even for a plow I must leave to some brother better informed on such matters. O. B. WALLACE.

A Testimonial.—I have been a reader of THE AMERICAN BLACKSMITH only three months, but I think it is all right and can hardly wait for the end of the month. As soon as the mail man hands it to me I stop working and look it through to see what pointers I can find.

I see that blacksmiths are putting power in their shops and that it pays well. I am buying a three horse-power Peerless gasoline engine and think it will pay. I run a general jobbing, wagon and wood working shop, and do heavy work of all kinds. The nearest saw mill is two miles. The day will come when the smith must have power in his shop in order to be up-to-date in his methods and business. CHAS. HOJOHN.

Cutting Rivets in Wheels.—If a workman should cut a rivet in a Sarven or other hub riveted wheels, he should pay for ruining the wheel (if he is worth it). No man with a common riveting hammer can put the flange back against the spokes as it was placed by the powerful pressure of 20 to 50 tons exerted by the machinery used in the manufacture. Experience of fourteen years in a wheel factory where hub-riveted wheels were made, and nineteen years where we have been repairing, prove to us that in every case where a hub-riveted wheel has come in with spokes loose and rickety, the rivets have been tampered with. When such wheels come for new spokes, don't cut a rivet and let up on the pressure of the flange, but mortise the old tenon out, cut a place in the spoke for the rivet, fit and drive as for wood hub wheels. A good job is done this way. H. K. VANTYNE & SON.

Pointing Plows.—I point with 1½ by ½ inch hammered steel. I rip the share from the bar 2½ or 3 inches up, draw my point out thin and leave the end as wide as possible for the bottom. Draw the width of bar about two inches, and double under bottom. It is easy welding and when completed the point will be the same as when new. Some of our prices are:

Four plain shoes.....	\$1.00
Four toed shoes.....	1.40
One pair front toe weight, steel.....	.65
Resetting.....	.70
Setting wagon tire.....	2.00
Setting buggy tire, new bolts.....	2.25
Filling wagon wheels.....	3.00
Wagon tongue.....	2.00
Buggy tongue.....	2.50
Rim buggy wheels.....	2.00
Sharpening 12-inch plow.....	.20
Pointing plows.....	.75 to 1.00

Our other work is in proportion to these prices. J. D. WORLEY.

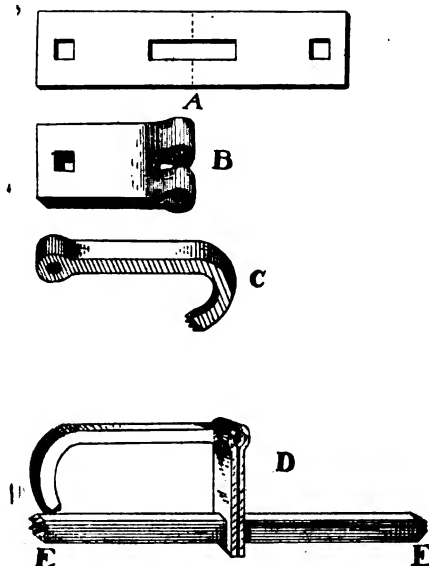
Some North Carolina Prices.—I wish every smith in this country would take THE AMERICAN BLACKSMITH and learn how to price work. Our work is done too cheap here. I run a shop 25 by 45 feet, and have a Champion No. 1 forge, a drill and a Little Giant tire upset, also an Ideal tire bender which is a good one. One thing I want now is a gas engine and I will be fixed in good shape. I run a general repair shop and build a lot of new carts and wagons. I also do a good shoeing business. I will give you some of my prices:

A new wagon tongue.....	\$1.25
New hounds.....	3.00

New bolsters.....	\$1.50
Reacher.....	1.00
Filling wagon wheel.....	2.00
Shrinking tires each.....	.40
Shoeing horses, set four shoes.....	1.00

I give a few of our prices so some other brother can see how things are going here. We don't get enough for some of our work and some we can make a good profit on. I wish some brother would tell me which is the best tire setter to buy and the easiest to handle. W. E. MARKER.

A Bolt Holder.—Take a piece of good steel and forge it to ½ inch square by 18 inches long, file each end to four points, as at EE in the sketch. Now take another piece like EE, 10 inches long and shape it as at C, filing four points on one end and making a solid eye on the other. Then take a piece of plow steel, A, 1½ by ½ by 12 inches, and cut



A BOLT HOLDER AND METHOD OF MAKING.

holes ½ inch from each end and a slot in the middle, wide enough for the eye on hook C. Now bend the plate, A, at dotted lines, so it will look like B, insert the eye of hook in slot and rivet. Now place bar EE in holes cut in plate and you have the best bolt holder ever made. D shows the finished holder. J. G. LOWRY.

Some Illinois Prices.—I have a blacksmith and wood shop, 20 by 36 feet. I do all my work myself, which consists of plow sharpening, repairing, horseshoeing, wagon and carriage repairing and painting. I also handle harvesting machinery and in winter make and repair sleighs. Prices are as follows:

Plow sharpening.....	.20 to \$.30
Plow pointing.....	.50 to .75
New shares—14-inch.....	3.75
Plows handles, per pair.....	1.00
Wood plow beams.....	1.50 to 1.75
Horseshoeing, new shoes, per pair.....	.75
Old shoes reset and sharpened.....	.40
Old shoes, new toes.....	.50
Wagon axles from.....	\$2.50 to 3.00
Wagon bolster.....	1.50
“ tongue, pole only.....	1.75
“ complete.....	3.75
“ hounds front, per pair.....	1.50
“ hind.....	1.20
Spokes each.....	.20
Felloes.....	.25
Tire setting, per set.....	2.00
New spindles for buggys.....	\$5.00 to 6.50
Buggy poles.....	2.00

Painting from \$5.00 up according to size of vehicle and grade of work. A. HANG.

Causes of Corns.—I think that the brother smiths will agree with me that nine bad

corns out of every ten will be found in feet with good hoofs, solid heels and bars, and I think shoers are to blame for corns in most cases. I will give my customers five dollars for every corn they will find in their horse after I shoe them six months. To go into details of different kinds of feet and corns would take up too much of your valuable space. I will try to explain the cause of corns in good solid heels and bars, for they are the most difficult to cure. First I will call attention to the cause. To prove my theory take two number eight or nine nails, place one nail near the heel on the outside of the hoof, the head one or one-and-a-half inches below the hoof, and place the other nail on the bar next the frog about three-quarters of an inch from the heel, with the head about even with the other. You will notice the heads will be closer together than the points. The horny sole is produced by the fleshy sole; as the sole grows continually it is jammed between the bar and wall and must be pared, for there is no way for the sole to peel when jammed between the bar and heel.

Now for the cure, I cut the bar as far as I see the corn, also cut the corn as much as possible. Pare the heels so as to leave a space between the shoe and heel. Sometimes I use a bar or half-bar shoe. I have used spirits of salt, or have burned brimstone on the corn, but of late years I use a small heated iron and very little rubbing will do if the iron is heated white and the corn well pared. The shoe should not be left on longer than one month. When you remove the shoe, pare the corn and bar as before, and also use the hot iron once a month as long as any trace of the corn is seen. If the bar is kept in proper shape and the heels cleaned out, you will never see a corn in a foot with a good heel and bar. I have cured many this way. FRANK SMITH.

A Jack-of-all-Trades.—I am very much pleased with and interested in your paper and will add my little mite.

I am a jack-of-all-trades, but make blacksmithing the main one. I am located 13 miles from a railroad in a very fertile valley. I came here from Georgia, one year ago last winter, and rented this shop. I commenced March first, with borrowed money, as I had not even enough to buy tools or household goods with. I started at prices much higher than my predecessor, but still not high enough for me and I am going up with them as fast as I can.

The first year I gardened a little, as I did not get very much work to do. But this year I have more work than I can attend to and have to keep a helper most all the time.

Last of all I put a barber chair in one room of the shop, and this pays me from \$1.50 to \$6.00 a week. I only run the chair at odd times and Saturday nights. I worked at the barber trade in the South for about two years and I can give a man a very good scrape. I also put in a harness bench and handle a small stock of harness hardware as well as harness, and I get quite a little harness repairing to do.

Of course I can sleep as well as eat, when I get time, but I find that the more I work, the better I can pay my bills. I have a nice stock of blacksmith supplies as well as quite a few tools, a great many of which I made myself.

I think as near as I can calculate I have cleared over and above expenses, by work and trading, about \$500. I have a team wagon and harness, a carriage, one colt, a fine cow, 14 head of hogs, grain enough to last me until spring and new customers coming to my shop every day or two. Of course I have done this by hard work and a little push, but these are necessary in all business. J. W. SMITH.

SUPERIOR Horse Rasps

The Best Yet

Best High-grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim,
which gives the user the advantage of a long stroke,
and at the same time a rasp of medium weight.

Ask Your Dealer For Them



THE FOWLER NAIL COMPANY, SOLE MANUFACTURERS, SEYMOUR, CONNECTICUT.

Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Sept. 24, 1904, and are subject to change. No variations have taken place since last month's quotations. All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

$\frac{1}{2}$ in., round or square; Iron, \$2.80; Steel, \$2.90	
$\frac{3}{4}$ in., " " " 2.40 " 2.40	
$1\frac{1}{2}$ in., " " " 2.20 " 2.20	

Flats—Bar and Band.

$\frac{1}{2}$ x 1 in., Iron, \$2.20; Steel, \$2.20	
$\frac{1}{2}$ x $1\frac{1}{2}$ in., " 2.10; " 2.10	
$1\frac{1}{2}$ x $1\frac{1}{2}$ in., " 2.00; " 2.00	

Norway and Swedish Iron.

$\frac{1}{2}$ in., round or square, \$4.90	
$\frac{3}{4}$ in., " 4.50	
$1\frac{1}{2}$ in., " 4.00	
$\frac{1}{2}$ x 1 in., " 4.00	
$\frac{1}{2}$ x $1\frac{1}{2}$ in., " 4.00	

Horseshoe Iron.

For No. 1 shoe, $\frac{3}{4}$ x $1\frac{1}{2}$ in., \$2.90	
For No. 2 shoe, $\frac{3}{4}$ x $\frac{5}{8}$ in., 2.90	
For No. 3 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.80	
For No. 4 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.80	

Toe Calk Steel.

$\frac{1}{2}$ x $\frac{3}{4}$ in. and larger, \$2.00	
--	--

Spring Steel.

$\frac{3}{4}$ to $1\frac{1}{2}$ in. Rounds. Op. Hearth \$3.00, Crucible \$2.00	
$1\frac{1}{2}$ to 6 in. by No. 4 gauge to $\frac{1}{2}$ in. Flats " 3.00, " 5.00	

Carriage Bolts. (Net Price per Hundred).

$\frac{1}{2}$ x 2 in., \$0.54	$\frac{3}{4}$ x $2\frac{1}{2}$ in., \$0.62
$\frac{3}{4}$ x $2\frac{1}{2}$ in., .58	$\frac{1}{2}$ x $2\frac{1}{2}$ in., .96
$\frac{1}{2}$ x 3 in., .62	$\frac{3}{4}$ x 3 in., 1.21
$\frac{3}{4}$ x 3 in., .65	$\frac{1}{2}$ x 4 in., 1.70
$1\frac{1}{2}$ x 2 in., .75	$\frac{3}{4}$ x 4 in., 2.10
$1\frac{1}{2}$ x 3 in., .75	$\frac{3}{4}$ x 6 in., 2.10

PADDOCK-HAWLEY IRON CO.

Iron, Steel, Carriage and Heavy Hardware,
Trimnings and Wood Material. . . .

ST. LOUIS, MO.

CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

FOR RENT—Well equipped blacksmith shop. JONAS TAUTPHAEUS, Sappington, Mo.

SITUATION WANTED—A two years' apprentice would like chance to finish blacksmithing and wood-working. Address: G. W., Care of AMERICAN BLACKSMITH, Buffalo, N. Y.

FOR SALE—Blacksmith shop, house, two lots. Plenty of work. Only shop in town. Address, GEORGE TEAL, Mt. Comfort, Ind.

FOR SALE—Blacksmith, wagon, buggy, paint and trimming shop, all complete. Two good dwelling houses with two acres of land and good fruit. Address CHARLES GABLE, Agent, New Freedom, Pa.

FOR SALE—Blacksmith and wagon shop in good town in Northwest Missouri. Brick shop. 25x35, gas engine, trip hammer, disc sharpener, saws, two fires and full set of tools. Two-story implement house and business in connection. Will sell with, or separate. E. R. McMAHON, Fairfax, Mo.

FOR SALE—A good paying Blacksmith and Woodworking Shop including business and building. Also carrying farm machinery. Good wide-awake town and plenty of work. For particulars address, BOX 311, Lemoore, Cal.

I CAN SELL YOUR BLACKSMITHING BUSINESS (with or without real estate) no matter where it is or what it is worth. Send description, state price, and learn my wonderfully successful plan. W. M. OSTRANDER, 109 North American Bldg., Philadelphia.

FOR SALE, CHEAP—One lot, 50 feet front, 110 feet deep, with two-story brick blacksmith shop 27x60 feet, paint shop upstairs. Best business location in one of the best towns on the Mississippi River. Reason for selling is old age. J. M. ANWAERTER, Fort Madison, Iowa.

FOR SALE—Blacksmith and wagon shop, frame building $1\frac{1}{2}$ stories, 18x36 feet. High lot 50x150 feet. Situated in small town in heart of Kansas oil and gas belt. Excellent place for all-around smith. Will sell with or without tools and supplies. Address, R. FRAZER, Earls, Kan.

Trade Literature and Notes.

MORGAN & WRIGHT, Chicago, Ill. have just issued an exceedingly novel hanger in nine colors, inscribed "My dad uses Morgan & Wright clincher tires on his auto," making an attractive souvenir of their automobile tires. A copy of this hanger will be sent by them to any one upon receipt of ten cents in stamps.

READERS can profit by the announcement of Dr. A. O. Daniels on page XXI, taking an agency as a side line. Write to him for full particulars.

THE THOMPSON TUYERE IRON Co., 2209 N. N. Jersey St., Indianapolis, Ind. are calling particular attention at this time to their Gem Fire Bed. Among the many points of advantage claimed for this fire bed are that it saves time and coal, fits any common tuyere iron, prevents the fire from spreading, keeps it clean and bright, and is on the whole the best fire bed made.

ON THE OPPOSITE PAGE, will be found an announcement new to AMERICAN BLACKSMITH columns. The Columbian Hardware Co., Cleveland, Ohio, are manufacturers of the Columbian All-Steel Anvils, and Solid Box Wrought-Steel Blacksmith Vises. These goods are fully illustrated in their complete catalogue, which is one of the handsonest ever received at this office. It should be in the hands of every blacksmith. Sent free upon request to the Columbian Hardware Company. Mention the AMERICAN BLACKSMITH.

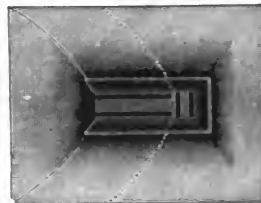
AIR CUSHION PADS. The Revere Rubber Co., Boston, Mass., Sole Manufacturers of these pads, guarantee a cure for any ordinary foot lameness, and they ask you to give them a trial in chronic cases. The reputation of this company for the quality and merit of the goods they manufacture is an absolute guarantee of good faith to those with whom they deal. Their Air Cushion Pads are made in twelve different styles, to meet the requirements of all horseshoers, and are suited for the lightest trotter or pacer and the heaviest draught horse. They maintain that there is "no lameness, no slipping" with Air Cushion Pads. In view of this they certainly merit a trial.

ON PAGE XIII will be found the new and attractive announcement of Wells Bros. Co., Greenfield, Mass., makers of taps, dies, screw plates and thread cutting machinery. Their handsome catalogue should be in the hands of every smith.

AMONG the neat catalogues received, that of the O. S. Kelly Company, of Iowa City, Iowa, stands out as worthy of special mention. Its 48 pages treat in detail of the Kelly Simplex Gas and Gasoline Engines and Duplex Feed Mills, and will be found of interest to every one interested in either of the machines in question.

UNIQUE and handsome is the 32-page catalogue just received from the Beaver Manufacturing Co., of Milwaukee, Wis., manufacturers of the Reliance Gas and Gasoline Engines. In addition to a very clear and comprehensive description of their engines, construction, operation and advantages of the same, a number of handsome engravings are presented showing the engine applied to various different lines of work. This catalogue will be sent free upon request to any address, and is well worth possessing.

THOMPSON'S EXTENSION TUYERE IRON



Best Made
Thousands in Use
Strong and Heavy

Size 15x20 ins.
Weight 65 lbs.
Depth 5½ ins.

A BLACKSMITH'S DELIGHT

This Tuyere Iron and Fire Pot saves time, coal and money. It's no experiment. Can get a fire from 2 to 14 inches long. GUARANTEED; sent on receipt of price, \$5.00. WHY NOT HAVE THE BEST? WILL PAY FOR ITSELF IN SHORT TIME.

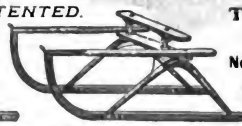
THOMPSON TUYERE IRON CO.
2209 N. N. JERSEY ST., Indianapolis, Ind., U.S.A.

Success
Oscillating
Sleigh
Knees.

For farm, road and
lumbering Bobs.
Sizes, 1½, 1¾, 2, 2½,
3, x 3½, in. runners.
Satisfaction Sure.
Try Sample Set.



PATENTED.



Valley City Bent Knee Bob Sleighs.

For Pleasure, Delivery,
Express, Sleigh, etc.

The Strongest,
Neatest,
and Best.



Sherwood Hall Co., Ltd., Manufacturers.

THIS is the Brown Oscillating Sleigh Knee.

Needs No Recommendation.

Satisfaction Guaranteed.

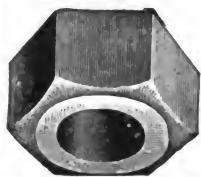
Sizes, 1½, 1¾, 2, 2½, 3 and 3½.

Write us.



Grand Rapids, Mich.

SPECIFY

"MILTON"
NUTS & WASHERS

MANUFACTURED BY
THE MILTON MANUFACTURING CO., MILTON, PENNA.



THEY ALWAYS GIVE
SATISFACTION.
THE PRICE WILL
INTEREST YOU.

Did You Ever Stop to Consider the Blacksmith Shop of Today and 25 Years ago?

What Makes it Up-to-date? BELLOWS or BUFFALO BLOWERS, FORGES, DRILLS, PUNCHES, ETC?

KOSHKONONG, Wis., August 23d, 1904.

BUFFALO FORGE CO.,
BUFFALO, N. Y.

DEAR SIR:—I have the pleasure to inform you that I am the happy possessor of your 100 Blower. It went into actual service this A. M. As the sparks fly upward my heart leaps with joy, and as I look back to the olden days and the Master would say, Pump, pump away are you tired this early in the day? Now I am old and what hair I have left is gray. But with your 100 it's easy to blow, blow all day.

Yours respectfully,

GEO. CHATFIELD & CO.

P. S.—Whatever good I can do for you with word or pen I will do it for your good and my fellow-men.

New Catalogues and Photos of Buffalo Blowers, Forges, Drills, Steel Plate Punches, Etc., just out, Free on Application.

BUFFALO FORGE COMPANY,
BUFFALO, N. Y., U. S. A.



THE COLUMBIAN ALL-STEEL ANVIL

Are You Dissatisfied?

Every man who has ambition is dissatisfied; not necessarily disgruntled or discouraged, or a malcontent, but dissatisfied *because he wants to go higher*. This is the right kind of dissatisfaction—it is the sign of a man who will make progress.

It is the mission of the International Correspondence Schools to help the man who is dissatisfied—the man who wants to better himself.

INCREASED SALARY OVER 100 PER CENT.

After studying from textbooks at night schools with but little success, I enrolled, about two years ago, in the Electrical Engineering Course of the International Correspondence Schools. Since then my pay has been increased over 100 per cent. I am now employed on experimental work for the United States Government.

HUGH J. WHITE,

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Our system of instruction by mail has many advantages for ambitious people. It is the means by which thousands have been able to advance in place and salary. We enable young people to commence work at better salaries than if they started without training.

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Mark X before the position that interests you, fill in the coupon and send it to us. We will send full particulars.

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Please send me a free copy of "1001 Stories of Success," and explain how I can qualify for position before which I have marked X.

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<input type="checkbox"/> Municipal Engineer	<input type="checkbox"/> Mine Superintendent
<input type="checkbox"/> Heat, and Vent. Eng.	<input type="checkbox"/> Architect
<input type="checkbox"/> Chemist	<input type="checkbox"/> Bookkeeper
<input type="checkbox"/> Sheet-Metal Draftsman	<input type="checkbox"/> Stenographer
<input type="checkbox"/> Sanitary Engineer	<input type="checkbox"/> Ad. Writer
<input type="checkbox"/> Electrician	<input type="checkbox"/> French With
<input type="checkbox"/> Stationary Engineer	<input type="checkbox"/> German } Edison
<input type="checkbox"/> Marine Engineer	<input type="checkbox"/> Spanish } Phonograph

Name _____ Age _____

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OUR SIGNED GUARANTEE GOES WITH EVERY Columbian All-Steel Anvil

Built of Special Ingot Steel

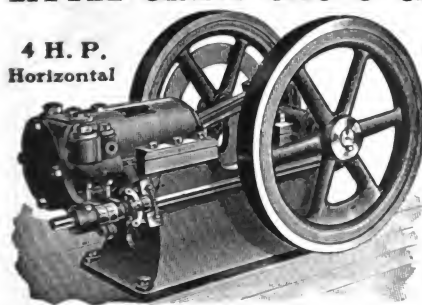
Only the best of workmanship employed

If you need a good Vise, send for particulars about our Solid-Box Wrought-Steel Blacksmiths' Vises. Every one warranted. Write at once for prices and handsome

CATALOGUE FREE

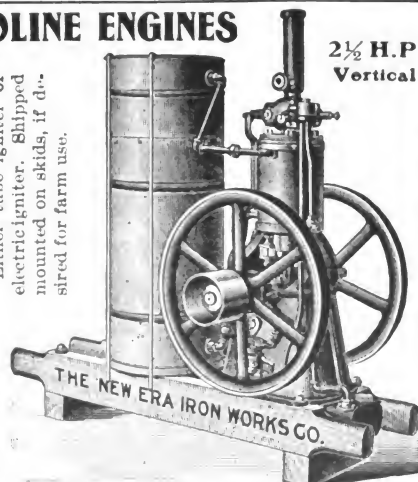
COLUMBIAN HARDWARE CO., - - - CLEVELAND, OHIO

LITTLE GIANT GAS & GASOLINE ENGINES



4 H. P.
Horizontal

Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.



2 1/2 H. P.
Vertical

Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.

No. 63 Dale Ave., DAYTON, OHIO.

Fac-Simile Letters

FOR
Circularizing and Follow Up Systems

Look like the original and bring results. Furnished complete with names filled in or ribbons to match.

LERNER-BEAN CO.,

363 Washington St., BUFFALO, N. Y.

BUFFALO FORGES

THE No. 600 SERIES



URING the years—now exceeding a quarter of a century—in which we have been building portable forges, hand blowers, drills, punches and blacksmith tools, we have brought out many a machine as far ahead of anything previously produced as today's modern ocean liner is ahead of Robert Fulton's first steamboat.

The No. 600 Series of Buffalo Forges mark the greatest improvement in forge construction the world has ever witnessed. Why? Because: the blowers work easier, will not wear out, require less attention, and give a stronger blast, with fewer turns of the crank per minute. They are of the most simple design. Nothing but the finest material and the most superior workmanship enter into their construction.

**Any Parts Wearing Out
In Five Years
Will Be Replaced
FREE OF CHARGE**

There are many geared hand blowers on the market, but what maker offers such a sweeping guarantee covering durability? The fire pan, tuyere, coal and water boxes of these forges, each part, in fact, is new in design and thoroughly up-to-date, to meet



BUFFALO No. 605 FORGE WITH TANK—STEEL PLATE CONSTRUCTION

every demand of blacksmiths doing the best work in modern shops. Each machine is sold subject to satisfactory test before paying for it. Your dealer will fill your order for one of them on this trial basis.

Durability, strong blast and easy running are the features of the Buffalo No. 200 Hand Blower used on the No. 600 series of Buffalo portable forges.

This blower represents the greatest possible advance in hand blower construction, beyond which there can be no improvement.

This guarantee goes with each machine:

We will replace without charge any repairs caused by wear, for five years. In all respects we guarantee this blower to outwear any other on the market. We guarantee it to produce a stronger blast with the same number of turns of the crank per minute, and with less power, than any other hand blower built.

This blower is also made with stand to use with different stationary forges, and with or without tuyere and pipe connections, as desired.

Descriptive matter and price mailed on request.

Have you our handsome new catalog of forges, blowers, drills and blacksmith tools? Drop us a postal for it.



BUFFALO No. 626 FORGE



BUFFALO No. 650 FORGE



BUFFALO No. 601 FORGE

BUFFALO FORGE COMPANY BUFFALO, N. Y., U. S. A.

For Industrial Locations

In Illinois, Wisconsin, Iowa, Minnesota, Upper Michigan, North and South Dakota, write to W. B. Davenport, Industrial Commissioner, 1329 The Railway Exchange, Chicago.

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Blacksmiths Can Make Money

Bishopville, Ohio, Sept. 20, 1908.

DR. A. C. DANIELS,
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I think my agency is worth more to me than a fourth-class post office, and the best of it is the people do the talking for me now.

Thanking you for your favors in the past, I am,
Respectfully,
(Signed) E. N. HOON.

Send to

172 Milk Street,
Boston, Mass.

Dr. A. C. Daniels,

Largest Manufacturers of
Veterinary Medicines
in the World,

For full information.



Dr. A. C. Daniels

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Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interest will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.



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there is a SHAW-WALKER way to do it.

And that way we guarantee is best and ask nothing but return of goods if after trial you do not think so

Check in the list above those items that interest you—tear out this advertisement and mail to us. That's the first step in simplifying your office or factory detail. And do it NOW.

The Shaw-Walker Co., Muskegon, Michigan



THE DICKINSON

Will do everything that any other engine will do, and will do things that no other engine will. We'll tell you the secret if you write us.

CENTRAL MACHINE & TOOL
CO., Ltd.
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TALK For Themselves

Our primers, fillers, ruff stuffs, elastic and Japan colors, and our paint and varnish removers never fail to give perfect satisfaction. Once a user, always a user.

THE CHAS. A. P. BARRETT CO.

MANUFACTURERS OF
COACH AND CAR COLORS.

Factory, - - Troy, Ohio
Office, 118 E. Third St., Dayton, Ohio

Send for our New Coach
Color Book and Catalogue

FUEL CONSUMPTION IS MORE IMPORTANT than the mere Price of an Engine.

The Fuel
Guarantee on

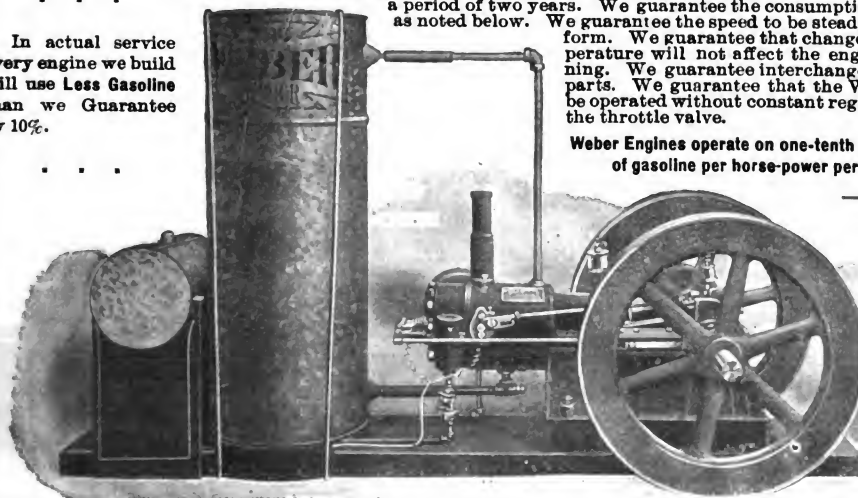
Weber Engines

Is Lower than that Made by Any Other Responsible Manufacturer.

GUARANTEE. All Weber Engines are guaranteed to be of the very best material and the very best workmanship, and we hereby agree to replace any part found defective f. o. b. our works without cost for a period of two years. We guarantee the consumption of fuel as noted below. We guarantee the speed to be steady and uniform. We guarantee that changes in temperature will not affect the engine's running. We guarantee interchangeability of parts. We guarantee that the Weber can be operated without constant regulation of the throttle valve.

Weber Engines operate on one-tenth of one gal. of gasoline per horse-power per hour.

In actual service every engine we build will use Less Gasoline than we Guarantee by 10%.



WEBER FACTS:

Only the very best material and workmanship go into WEBER ENGINES.

They stand the test of long, severe service.

Every engine is rigidly tested before leaving the shop.

Anyone can operate a WEBER ENGINE; they require but a few minutes' attention each day.

Weber Engines are Absolutely Safe.

We build engines from 2 1/2 up to 300 horsepower.

Twenty years' experience is back of Weber engines.

WEBER Gas and Gasoline

Engines are Safe,
Solid, Strong and
Simple; Durable,
Compact, Complete
and Economical.

Weber Gas and Gasoline Engine Co., P. O. Box V. 1114,
NEW YORK OFFICES, 115 Liberty St., N. Y. C. **Kansas City, Mo.**

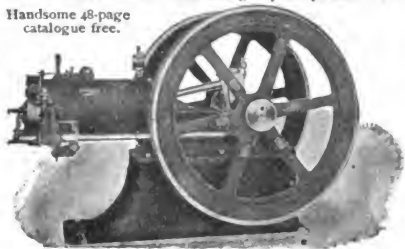
High Power at Low Cost

for fuel; quiet, smooth running, easy starting, the greatest reliability—that's what you get in

BADGER Gas and Gasoline ENGINES

Write at once for exclusive agency and prices.

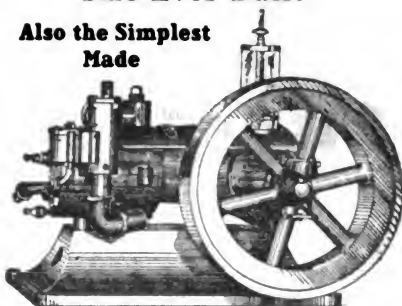
Handsome 48-page catalogue free.



C. P. & J. LAUSON
101 W. WATER STREET, MILWAUKEE, WIS.

Most Powerful Engine for its Size Ever Built

Also the Simplest Made



8 H.P. 21 INCHES LONG 150 POUNDS
There's value in our agency. One blacksmith sold three the first month.

Get Catalogue and Particulars
—Free on request.

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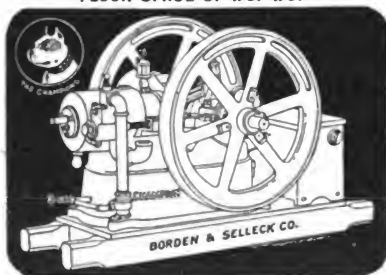
2 AND 3 H. P. GASOLINE CHAMPION ENGINES

ARE THE BEST ALL AROUND ENGINES EVER PRODUCED

NOTHING BETTER BUILT AT ANY PRICE

FULLY GUARANTEED

FLOOR SPACE 51" x 31" x 31"



CUT ILLUSTRATES THE 3 H. P. ENGINE.

Furnished either water or **OIL COOLED**. Sent on 10 days' trial to all responsible parties. **No Quibbling**; if not as represented, your money back instantly. Write for Bulletin 12; it tells the story.

BORDEN & SELLECK CO.,
MANUFACTURERS,

51 and 53 Lake Street, CHICAGO.

New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while his work is being "electrically" heated.

NEW ERA ELECTRIC CO.

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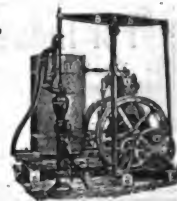


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GAS AND GASOLINE ENGINES.

Stationary, Portable, Marine, Hoisting and Pumping Engines. &c

BAUROTH BROS.,
Springfield, O., U. S. A.



To Owners of Gasoline Engines, Automobiles, Launches, Etc.

The Auto-Sparker

does away entirely with all starting and running batteries, their annoyance and expense. No belt—no switch—no batteries. Can be attached to any engine now using batteries. Fully guaranteed.

Write for descriptive catalogue.
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33 Main St., Pendleton, Ind.

FOOL-PROOF BECAUSE IT'S SO SIMPLE

The ELI Gasoline Engine is the **BEST** because it has no gears, cams, levers, or valve mechanism. **DON'T BE JOLLIED** into buying a complicated engine that's always out of order—get the ELI—no trouble then. Now get busy, brother, and write for booklet to-day.



"It's what's in 'er 't makes 'er go."

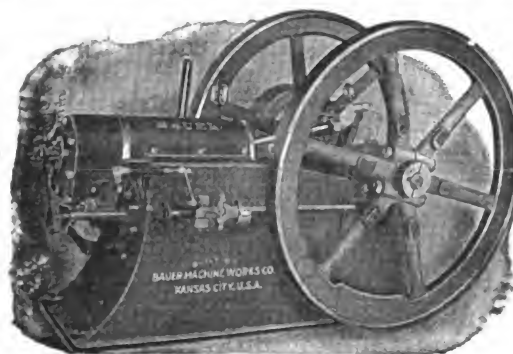
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THE ELI GASOLINE ENGINES

**BAUER GASOLINE ENGINES..**

The Acme of Simplicity and Perfection.

If you will examine and compare, piece by piece, you will say there is no other quite so good as the "Bauer." All sizes from 1½ to 20 H.P. Write at once for free catalogue containing long list of letters from satisfied users. Our prices are also very interesting, considering quality.

THE FIRST BLACKSMITH in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily. The Bauer is the best.

Write us Today.

Bauer Machine Works Co.
115-120 W. 18th St., KANSAS CITY, MO.

WANTED! Blacksmiths and Horseshoers

everywhere to sell the

EQUINE WATER-BOOT

the only *Patented* and *Scientific* device for applying nature's own remedy, water, to the foot of a horse.

By its use *Hard, Dry, Brittle* and *Contracted* feet are made soft and pliable like those of a horse in pasture. Pasture is brought to the horse instead of the horse to pasture. The *soaking tub* is a thing of the past.

For *Diseased Feet* the boot is *Medicated* and becomes a perfect *Antiseptic* and *Disinfectant*.

The boot is *Durable* and *Artistic* and *Sells at Sight*. Made with or without frog. Prices range from \$1.00 to \$2.50 per pair. Sample pair mailed prepaid to any part of the U. S. or Canada on receipt of the retail price.

Liberal discounts and protection to agents and jobbers.

Send for circular and price list. Address,

THE EQUINE WATER-BOOT MFG. CO., 519 Hamilton St., ALLENTOWN, PA.

**LOOK HERE!**

We carry a most complete stock of

Blacksmith's and Carriage Maker's Supplies

In fact our success has been largely due to having always had as complete a stock as possible on hand. For prompt shipments and exceptional values, get in touch with

BITTENBENDER & COMPANY

126 & 128 Franklin Avenue Scranton, Pa.



RELIANCE ENGINES



The Cheapest Power on Earth

AGENTS WANTED

Racine, Wis., Aug. 19, 1904.

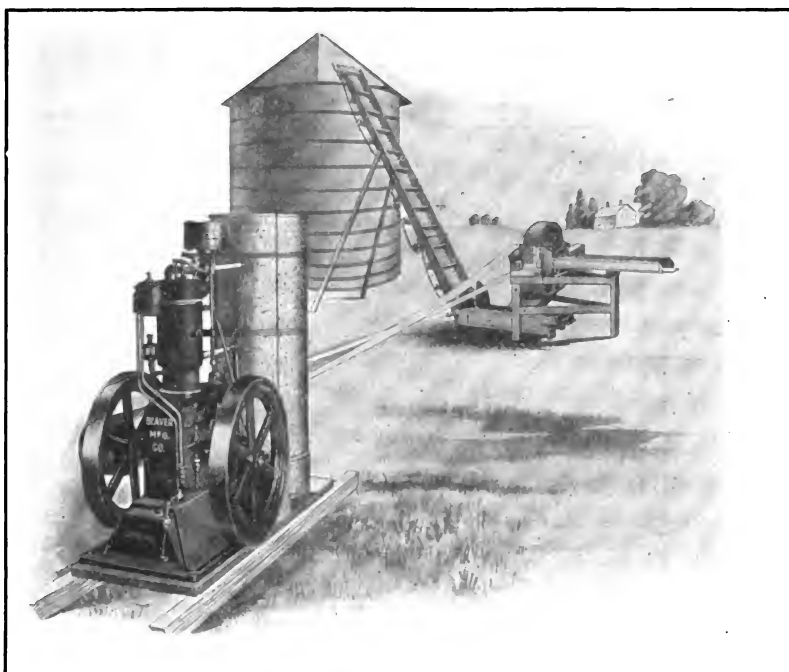
Gentlemen:

We have one of your six horse-power Reliance gasoline engines in operation in our factory, and it is giving satisfaction both in the rated power and the economy of fuel. Previous to this we had been using a four horse-power gasoline engine of another standard make, and this four horse-power engine consumed 40 per cent. more fuel than the six horse-power Reliance.

Your engine is all that you claim for it, and we are perfectly satisfied. Yours very truly,
RACINE PAPER BOX MFG. CO., By C. H. Broecker.

The Perfect Power

The Best
Most
Economical
Safest
Always Ready
No Trouble
And
The Price
Is
Right



The Engine
Mentioned Above
Runs 60 Hours
Per Week
On
An Average
Consumption For
The Past 18
Months
Of
18 Gallons
Of
Gasoline Per
Week

Write for Catalogue No. 15

BEAVER MANUFACTURING CO., Milwaukee, Wis.

Gentlemen:

I have one of your 8-H.P. Reliance engines and am well pleased with it. I run a twenty-four inch Belle City Thresher fourteen hundred revolutions per minute and can thresh one hundred bushels of oats per hour, at a cost of one sixth of a cent per bushel. I also run an eighteen-inch fodder cutter with a thirty-foot carrier and can cut fodder as fast as we can feed it into the cutter and can grind twenty-eight bushels of corn and oats an hour.

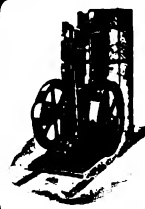
Anyone wanting a good engine should buy a Reliance.

Yours truly,
(Signed) H. J. Hansen.



BEAVER MANUFACTURING CO.

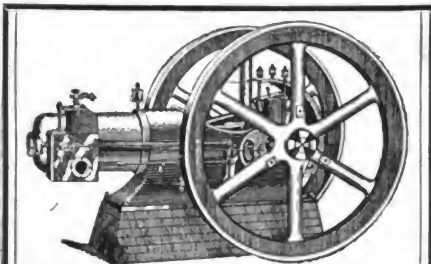
Milwaukee, Wisconsin



DON'T BUY GASOLINE ENGINES

Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

THE TEMPLE PUMP CO., Established 1853. Meagher and 15th Streets, CHICAGO.

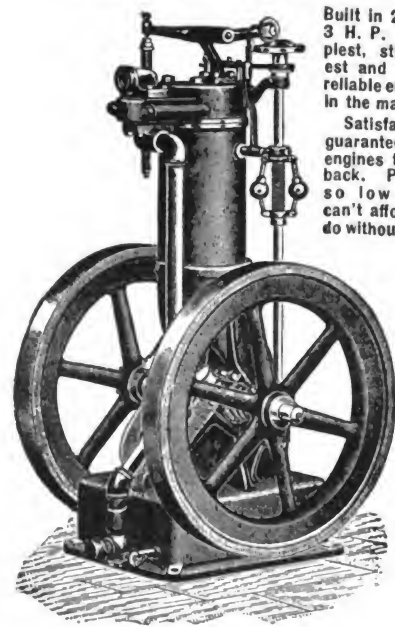


250 High-grade Engines built to use either gasoline or kerosene will be sold at MANUFACTURER'S COST within the next 30 days. Stationary, pumping and portable, in sizes from 2 to 100 H. P. Send for catalog and full particulars.

A. E. MYERS, Lock Box 2003, Auburn, Ind.

"WINNEBAGO CHIEF"

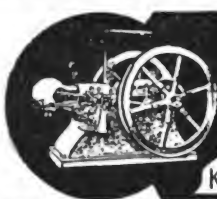
"CHEAPEST POWER ON EARTH."



Built in 2 and 3 H. P. Simplest, strongest and most reliable engine in the market. Satisfaction guaranteed or engines taken back. Prices so low you can't afford to do without.

Write for catalogue and prices.

National Engine Co., Rockford, Ill.

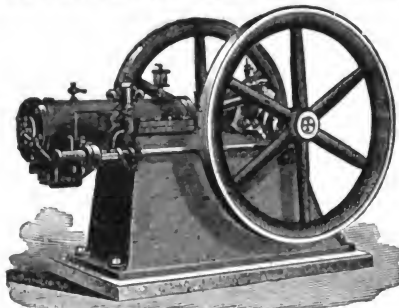


LIGHTNING GASOLINE ENGINE

NEW AND IMPROVED FEATURES SAVING EXPENSE
INCREASING POWER ALL SIZES WRITE FOR CATALOGUE
KANSAS CITY HAY PRESS CO. 482 MILL ST KANSAS CITY MO.

COLUMBUS GASOLINE ENGINES

ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33, Stating Horse Power You Need.

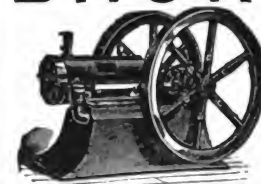
COLUMBUS MACHINE COMPANY,
Columbus, Ohio.

ECLIPSE GAS AND GASOLINE ENGINES.

Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.
Designed and Built for BUSINESS.
Catalogue on request.

MYRICK MACHINE CO., Olean, N.Y.

BACKUS

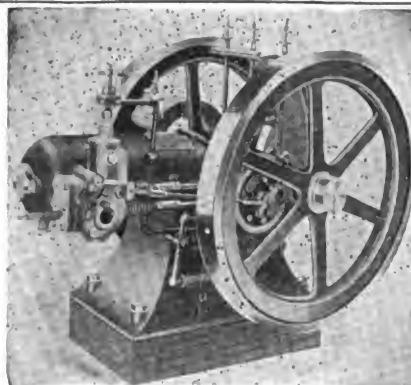


1 TO 100
H. P.

COMPACT
AND
RELIABLE.

GAS AND GASOLINE ENGINES.

Simple, Economical, Durable. You need one in your business. Write for circular and prices.
CHICAGO WATER MOTOR AND FAN CO.
22-24 S. Canal St., Chicago, Ill.

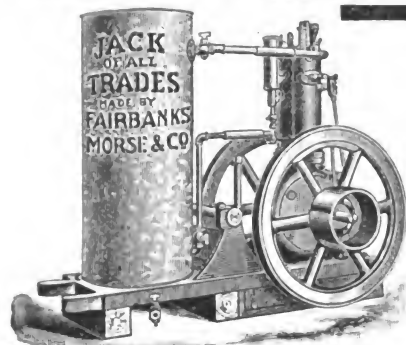


Model Gas and Gasoline Engines

Water or Oil Cooled

The most economical and simplest engine on the market. No cylinder head packing to blow out, and with our automatic sensitive governor, absolute regularity of speed. Stationary, Portable, Horizontal, Vertical Hoists, Pumping and Marine. Send for Catalogue No. 11.
We build the best launch engine of 3 and 6 H. P., with Reversible Bronze Propeller Wheel and Ideal Muffler.
If interested, send for circular.

CENTRAL CITY IRON WORKS
STEVENS POINT, WIS.



THE JACK OF ALL TRADES GASOLINE ENGINE

Develops over 2 H. P. It costs very little.

Send for Illustrated Booklet No. 80-F.

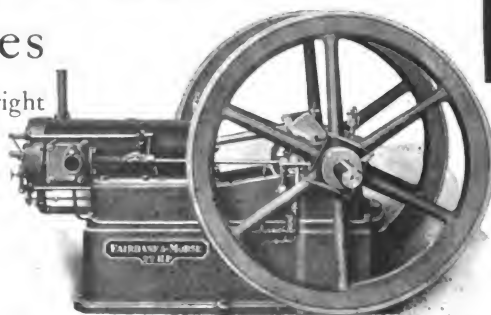
Fairbanks-Morse Gas or Gasoline Engines

Are best for the Blacksmith or Wheelwright

They develop more power for the money than any other. Get our catalogue and prices before purchasing elsewhere. Address nearest house.

Fairbanks, Morse & Company,

Chicago	St. Paul	Cleveland	Minneapolis	St. Louis	Omaha
Detroit	Denver	Louisville	San Francisco	Kansas City	Los Angeles
Indianapolis	Portland, Ore.	New York	Cincinnati	Salt Lake City	London, Eng.



129,580 No. 400 Champion Steel Blowers and Steel Forges Have Been Manufactured and Sold by Us in the Last Five (5) Years.

THE BLOWER THAT HAS REVOLUTIONIZED THE WORLD'S HAND BLACKSMITHS FIRES AND MADE BLACKSMITHING A MOST PROFITABLE BUSINESS.

Why is it that the No. 400 *Patented* *Spiral Gearing* is the only machinery that can be built to run a *Blast Wheel* at the extreme high speed necessary to make a white heat blast by hand, fully equal to the very best white heat blast that can be made by a blower run by power?

Why is it that the No. 400 *Patented* *Spiral Gearing* is the only durable high-speed machinery that can be built for a Blacksmith Blower?

THE ANSWER IS

1. Because it is simple in construction and every piece in it is built large, powerful and substantial.

2. Because every piece in a No. 400 Blower *Spiral Gearing* has at least ten times the strength required to run a No. 400 Blower or Forge.

3. Because only one piece of the entire *Spiral Gearing* of the No. 400 Blower runs at high speed.

4. Because this one piece of the No. 400 *Spiral Gearing* is the *Spiral Shaft*, as well as the *Blast Wheel Shaft*; therefore no other part needs run at high speed.

5. Because the No. 400 *Spiral Shaft* is the same in diameter and has the same sized teeth as are used on *Spiral Shafts* running at 20,000 revolutions per minute, and at this extreme high speed carry heavy loads; while the No. 400 Blower, running from 1,500 to 1,800 revolutions per minute, produces all the blast any fire can consume.

6. Because the concave *Spiral Gear* used on the No. 400 Blower is six inches in diameter. Its large size requires it to revolve very slowly.

7. Because with a six-inch concave *Spiral Gear* riding the *Spiral Shaft* lengthwise, 8 full teeth of the concave *Spiral Gear* mesh continuously in 8 full teeth of the *Spiral Shaft*.

8. Because the No. 400 *Spiral Gearing* runs in continuous mesh without noise or lost motion.

9. Because the No. 400 *"Patented," Spiral Gearing*, with its continuous mesh of eight teeth, renders lost motion and noise impossible.

10. Because the No. 400 Champion Blowers and Forges have as completely revolutionized the hand Blowers and Forges of the world in the last five years, as did the bellows of ancient days. The fact that this achievement of revolutionizing the hand blower fires of the world is our achievement, instills a pride of individuality into every No. 400 Blower or Forge we manufacture. To revolutionize anything is something that comes to few of us, to revolutionize a thing that is a source of pleasure and profit to the vast army of mechanics who use Blowers and Forges is a thing to be more than proud of—and we have this pride. Every part in the construction of the No. 400 is thoroughly inspected by competent mechanics and is the best in every way that can be produced, and if it were not for our automatic, special made machinery, invented and built by ourselves especially to manufacture the No. 400 Blower and *"Patented"* *Spiral Gearing* and Adjustable Ball Bearings, the high-class machinery which the No. 400 Blower represents, could not be built for less than three times the money it costs.

The No. 400 Champion Steel Blower and Steel Forge sales for the spring of 1904 were 41% greater than the spring of 1903, and 45% greater than the spring of 1900. In order to prove what we say above, we refer you to the Jobbers and Dealers of the world who have sold these Blowers and Forges for us.

No. 400 Champion Steel Blowers and Steel Forges are all sold guaranteed to make a white heat equal in every respect to a Blower run by power.

This white heat blast is only reached by the extreme high speed given the *Blast Wheel*—the No. 400 *"Patented"* *Spiral Gearing* being the only machinery that can be built to reach this extreme high speed by handpower.

No. 400 Champion Steel Blowers and Forges are all guaranteed to increase the earnings of every fire, FIFTY CENTS (\$0.50) PER DAY, and on heavy work ONE DOLLAR (\$1.00) PER DAY over and above any other Blower, Forge or Bellows. No. 400 Champion Steel Blowers and Forges are all sold subject to our guarantee for one year.

No. 400 Champion Steel Blowers and Forges can all be returned to our factory at our expense, after being used ten (10) days, if they are not found as we represent.

Blacksmiths 129,580 of No. 400

Champion Steel Blowers and Steel Forges are in use today, scattered all over the civilized globe. The users of them may be found in every nook and corner. Some of them are being used in your neighborhood. Ask the users to tell you of their experience, and they will freely tell you of the money-making and labor-saving powers of the No. 400. Get THEIR VERDICT; and after you get that verdict you will be convinced that it will pay you to throw out any other Blower, Forge or Bellows that you may be using, and replace it with a No. 400 Blower or Forge.

Ask your Jobber to ship you a No. 400 Champion Steel Blower. use it ten days in your own shop, at your own fire, and if it does not do even more than we claim, ship it back to our works, we to pay all freights.

Write for 228 page Catalogue illustrating the largest and most up-to-date line of Lever and Crank Blowers and Forges, Blacksmith Post Drills, Screw Plates, Tire Benders, Tire Shrinkers and Welders, Power Blowers, Etc.,

manufactured under one control in the world.

U. S. Patents covering the No. 400 Champion Steel Blower and Steel Forges granted June 11, July 30, 1901, and April 15, 1902.

Patent Numbers
676,322 34,882
676,323 34,883
676,324 34,884
34,880 34,885
34,881 697,609

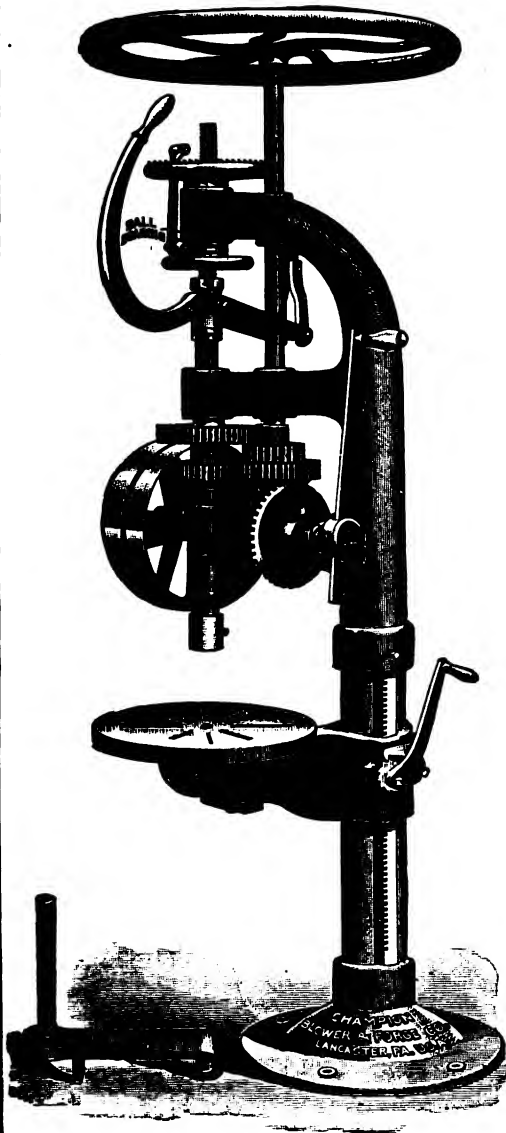
Also Great Britain Patent No. 9,662, May 25, 1900.

The No. 400 Blower, as it is constructed, can be bought by the youngest mechanic with the assurance, that, with the most ordinary care, it will serve him faithfully without expense for a long lifetime.

THE BLAST
WITH THE No. 400
BLOWER IS MADE BY TURN-
ING THE CRANK EITHER WAY.
IT MAKES A BLAST GUARANTEED
EQUAL TO A BLOWER RUN BY POWER.

THE CHAMPION BLOWER & FORGE CO., LANCASTER, PA., U. S. A.

The Champion Lever-Feed and Automatic Self-Feed Post Drills and Upright Drills



No. 203 1/2 Upright Drill

Are the only Combination LEVER-FEED and AUTOMATIC SELF-FEED Post Drills and Upright Drills on earth, that are operated either by HAND or HAND and POWER combined

With either the Lever-Feed or Automatic Self-Feed

95 per cent. of time and labor is saved by the instantaneous raising of the drill bit out of the work.

50 per cent. in time and labor is saved by the use of the lever in drilling small holes, reaming, counter-sinking, etc. The LEVER-FEED makes it a capital WOOD-BORING machine for Blacksmiths. Either the LEVER-FEED or AUTOMATIC SELF-FEED is always ready for work. The feeds are changed from one to the other in a fraction of a second; therefore, are always ready for any kind of work to be done.

The Champion Combination LEVER-FEED and AUTOMATIC SELF-FEED Blacksmith Post Drills are the only HAND or HAND and POWER Blacksmith Post Drills ever built with both

Lever-Feed and Self-Feed

They are not a mere improvement on hand drills. The invention is absolutely new and REVOLUTIONIZES the work of drilling in the blacksmith shop to the extent of reducing the TIME and LABOR in drilling metal by hand, in many instances, to more than one-half, in other words, they give the Blacksmith the benefit of a hand or hand and power drill with swift moving methods which produce immediate results, which we guarantee equal in every respect to the latest improved and highest grade power Drill used in Machine Shops.

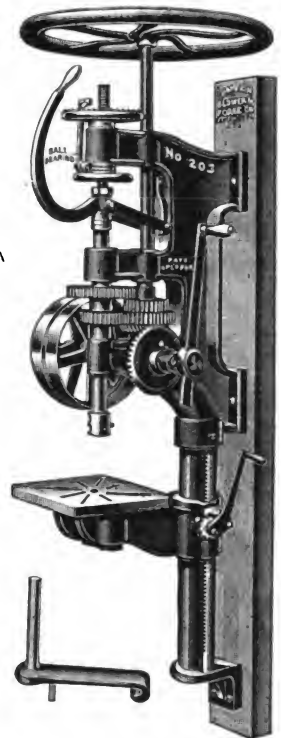
WE MANUFACTURE

52 Different styles and sizes of Post Drills.

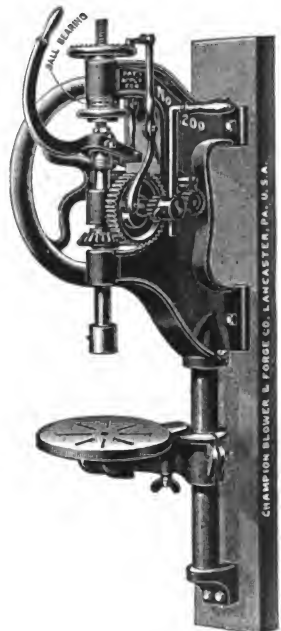
4	"	"	"	Upright Drills.
14	"	"	"	Blacksmith Blowers.
86	"	"	"	Forges.
9	"	"	"	Tire Benders.
3	"	"	"	Tire Shrinkers.
4	"	"	"	Screw Plates.

cutting from 7-64 to 1 1/4 inches. Power Blowers and Exhaust Fans all sizes, from 6 inches to 8 feet in height. Our assortment in each line is the largest, most up-to-date and complete in the world. We never lay dormant, are always on the alert for improvements; therefore, guarantee our various lines built scientifically, and to represent the latest improvements in every respect and at prices to meet all.

Write for Our 228 Page Catalogue.



No. 203 Post Drill



No. 200 Post Drill



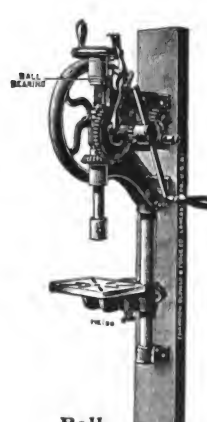
No. 101



No. 98



No. 95



Ball Bearing

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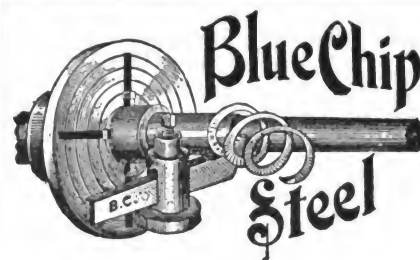
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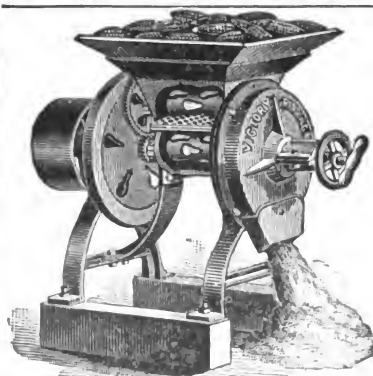
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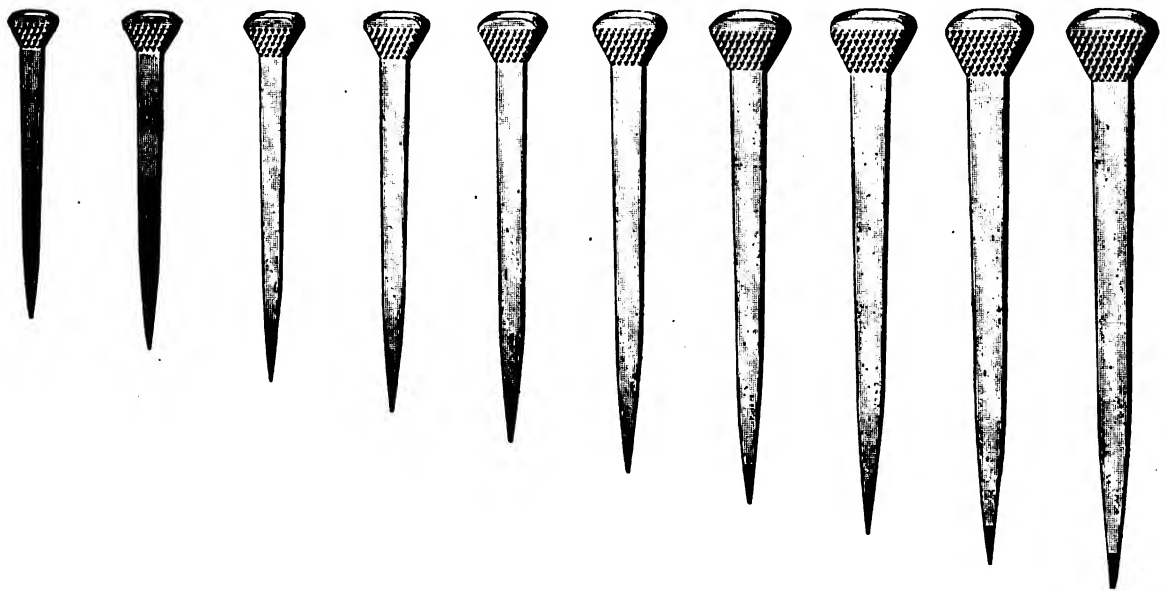
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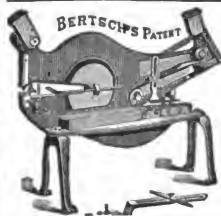
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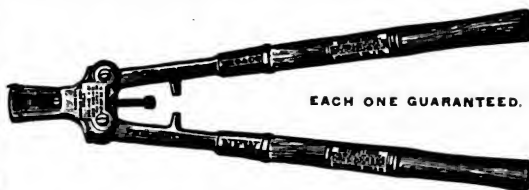
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LOOK

LOOK AT PAGE III

First page inside of front cover.

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Write to us for full information about

The Henderson

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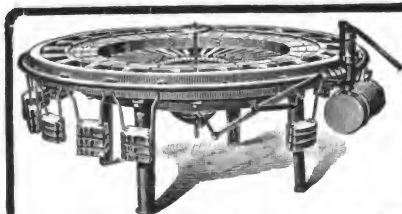
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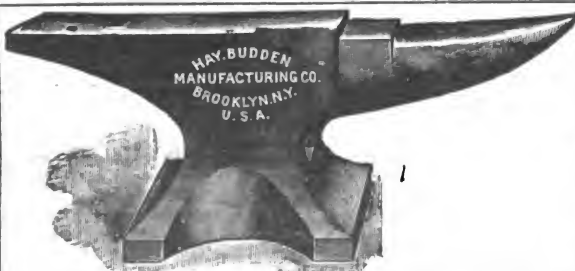
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VOLUME 4

THE

NUMBER 2

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

NOVEMBER, 1904

\$1⁰⁰ A YEAR
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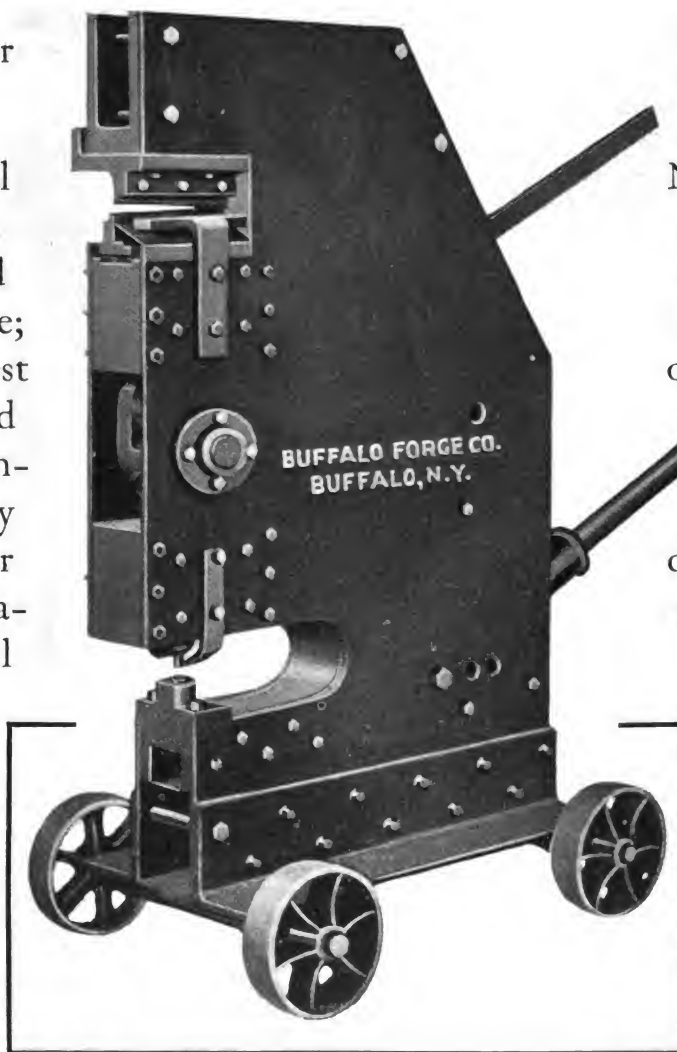
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Fig. 900, 12 inches.

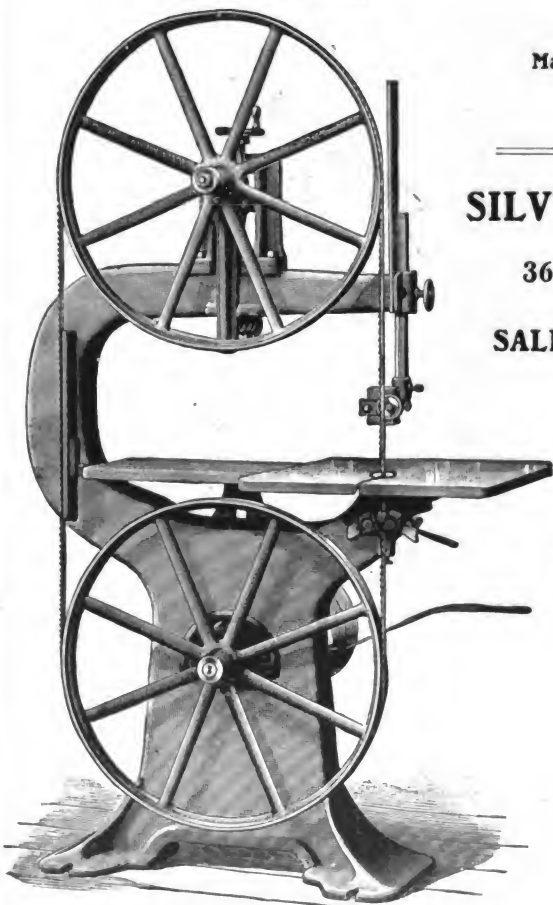


Fig. 822, 32 inch.

Fig. 900, "Elite," Silver Blower (*patent applied for*) is distinctive in design, has cut gearing and removable, interchangeable bronze bearings for gear pinions. The gearing is self contained and attached to side of fan case, has an outer bearing plate over it and is thus permanently secured so that there is no unnecessary friction or lost power. The gear covering is removable without disturbing the gearing or paddle spider. There is a light tuyere for clay lining and a heavy one to use without lining. All parts are interchangeable.

Fig. 822, Band Saws are made in sizes 20 and 26 inch for foot or belt power and 32 and 36 inch for belt power. They are admirably adapted to factory and repair work of every kind.

Fig. 718, Spoke Tenon Machine cuts tenons $\frac{1}{8}$ to 2 inches diameter up to 6 inches long and also bores the felloe.

Fig. 709, Taper Hub Boxing Machine is made as illustrated, on legs and also without legs to mount on bench. It bores tapering holes in the hubs for the boxes and cuts the recesses for nuts and collars.

Made also for hand and power.

Also Forges, and a complete line of Hand and Power Drills.

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SILVER MFG. CO.,

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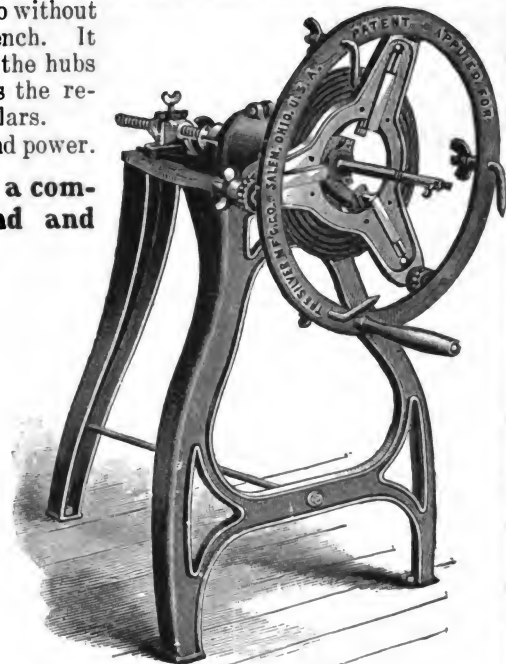


Fig. 709.

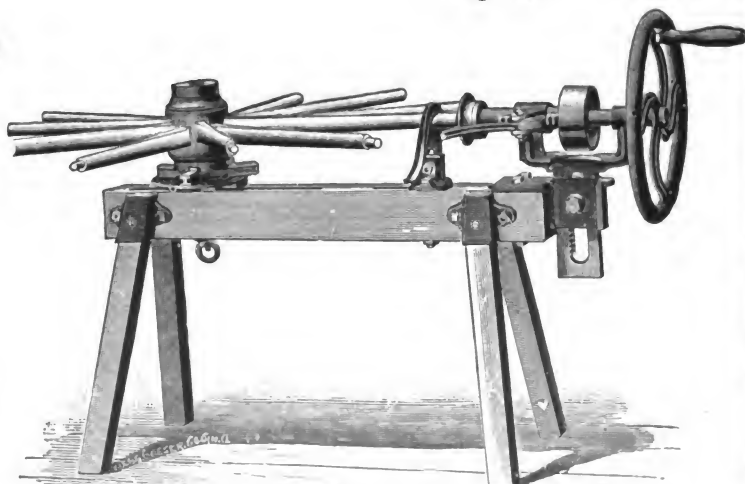


Fig. 718.



GEO. H. CRAY.

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Everything For the Blacksmith and Wagon Maker

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Buffalo, N. Y.

Cleveland, O. Nov. 1, 1904.

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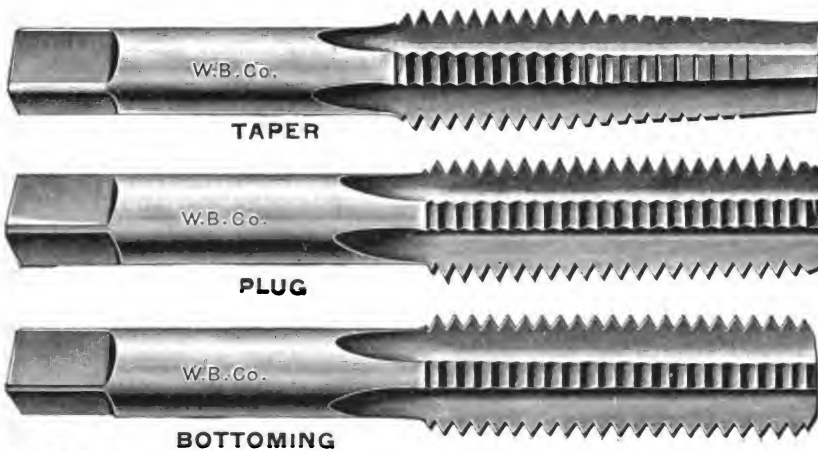
Thanking you in advance for all favors shown, we are,

G-S

Yours very truly,

CRAY BROTHERS.

P. S.-It may be interesting to know that we handle an excellent line of stoves. They are fuel savers, heat producers, also money savers. Price list is interesting and is gladly sent on request.



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Those words used in connection with screw cutting tools mean

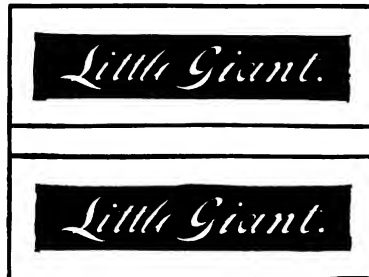
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They are made to cut and made to last. Our name guarantees them.



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Tools are well and widely known for their **Simplicity**, durability and fast, accurate screw-cutting qualities.

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for taps and reamers are recognized as standard. High quality and reasonable cost explains their wide popularity.

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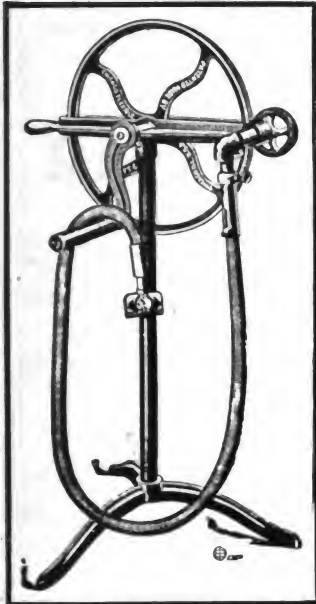
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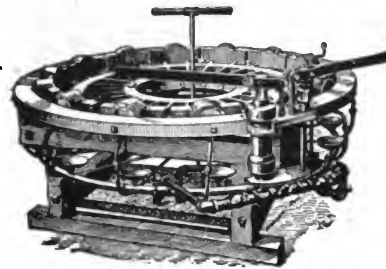
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Is carefully built, heavy and durable. In use **TWELVE YEARS**, improved as experience suggested, the standard the world over. "The Machine that Made Cold Tire Setting Famous."

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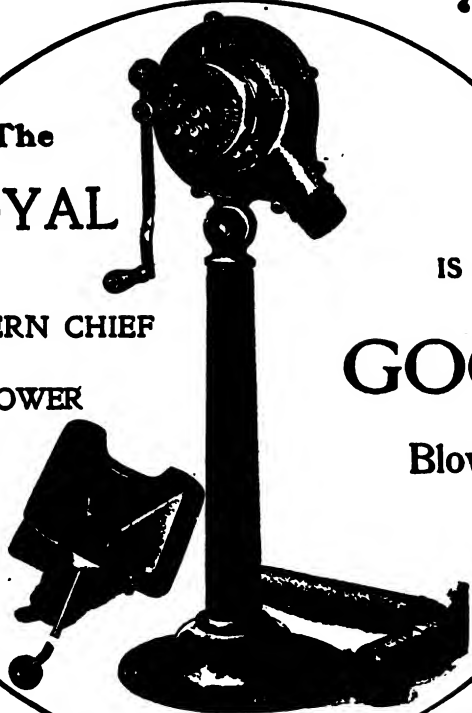
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ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.

Gears and Boxes are phosphor bronze and steel.

No spiral or worm gears.

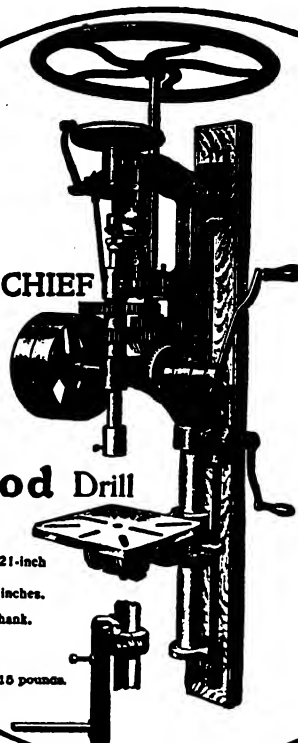
Fan, 12 inches. Weight, 100 lbs.

Fire-pot measures $9 \times 11\frac{1}{2} \times 4$ in. inside.

No. 14 DRILL

This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.

THE
WESTERN CHIEF
DRILL
No. 14
is a Good Drill



It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table

Drills to center of 21-inch Circle.
Bores from 0 to $1\frac{1}{2}$ inches.
Takes Bits $\frac{1}{2}$ or $\frac{1}{4}$ Shank.

Weight, 315 pounds.

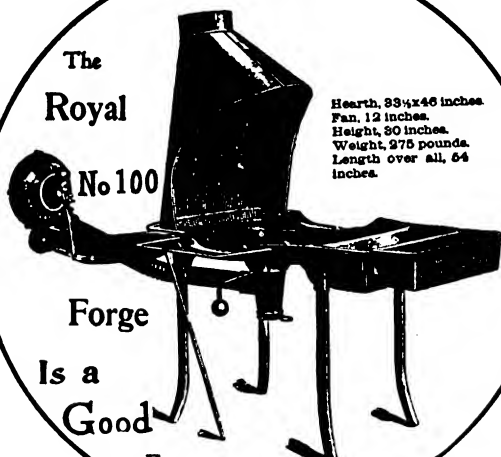
The
Royal

No 100

Forge

Is a
Good

Forge



Hearth, $23\frac{1}{2} \times 46$ inches.
Fan, 12 inches.
Height, 30 inches.
Weight, 275 pounds.
Length over all, 64 inches.

No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.



There's Money In Neverslip Pads

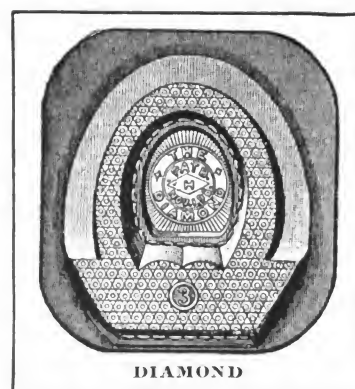
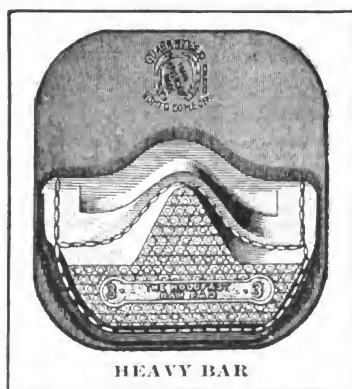
Not only for the blacksmith who is furnishing them, but also for the horse-owner.

Horse-owners are alive to
the advantages
and economy of using

Neverslip Pads

They know that when their horse has a pair on he is sure footed, confident, shows better action and style, and what is best of all, will be cured of any diseased condition that may have appeared in his feet. The shoer that is alive to his own opportunities will carry a line of NEVERSLIP PADS and be prepared to furnish his patrons with the greatest boon that ever was invented for the comfort of man's best friend—the horse. NEVERSLIP PADS will increase your trade.

Start today to pocket the profits that NEVERSLIP PADS yield, by sending for our free catalogue showing styles, prices and sizes.



NEVERSLIP MFG. COMPANY
NEW BRUNSWICK, N. J.

Why Spend Good Money

for a new anvil, when we can fix up your old one "good as new"?

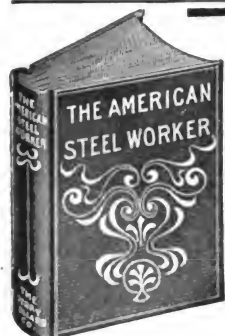
LOOK AT THIS

THEN AT THIS

We are experts at repairing old wrought anvils.

WRITE FOR PRICES

Columbus Anvil and Forging Co.
Frankfort St., COLUMBUS, OHIO



"BEST BOOK I EVER SAW"

Writes a blacksmith. Lots of others say so, too. Markham has been hardening steel for 27 years and studying it all the time. He tells in plain English just how to handle each case. Shows the best methods; but if you can't get them, it tells you how to do good work with what you have.

You can build a first class furnace if you want to from his plans and use any fuel you like.

Don't think you've got this information in other books—you haven't. It isn't there. Other books may read nicely and sound well, but none of the authors has had Markham's experience, and that's what counts.

343 pages, \$2.50.

Money back if not satisfied, or sent on approval.

AMERICAN BLACKSMITH COMPANY,
P. O. Drawer 974. BUFFALO, N. Y.

MODERN POWER HAMMER

FOR

BLACKSMITHS AND
IRON WORKERS

Used Daily Cures That
"TIRED FEELING."

Height, 5 Feet.
Floor Space, 30x40
Inches.
Weight, 1200 Lbs.

Length of stroke changed instantly while running. The only hammer made that will strike a very light blow at full speed. All others slow down to get a light blow.

The "Modern" gives you any blow you want at any speed; hand lever controls the force of blow, foot treadle controls the speed.

Long planed guides adjustable for wear. Cast steel hammer adjustable up and down to suit thickness of stock. Tool steel dies.

Greater range of work than any other hammer.

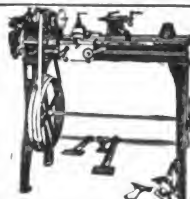
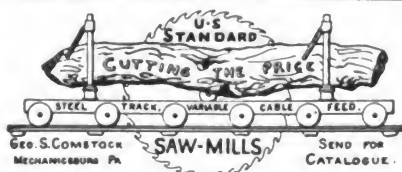


MANUFACTURED AND FULLY GUARANTEED.

GRINNELL MFG. CO.,

GRINNELL, IOWA.

SUCCESSORS TO THE KOCH MFG. CO.



LATHES

First-class Tools at reasonable prices. We build foot and power lathes from 9 in. to 15 in. Sensitive drills, emery grinders and wood lathes. Write for complete catalog. We guarantee to interest you.

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MACHINE TOOL CO.

BATAVIA, OHIO - U. S. A.

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TIED
TOP
BUGGY.
\$27.50

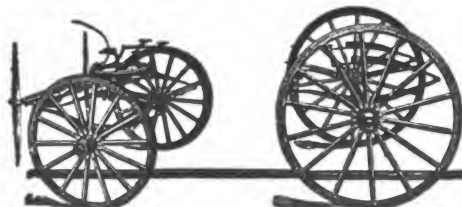


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TOPS,
\$4.50

Write for 100-page Catalogue. It's free. Compare Our Prices.
BUOB & SCHEU, Estab. 500-520 EAST COURT ST.
1883 CINCINNATI, OHIO.

GEARS IN THE WHITE

Catalogue
A



1,000 Styles
and Sizes

THE AKRON-SELLE CO., Akron, O.

EATON
Letter Company

73 W. Eagle St., Buffalo, N. Y.

Ever Send Out circular letters to the TRADE? Our imitation typewritten letters absolutely cannot be distinguished from the real. They are the kind that get attention, that bring results. Send for free samples.

ONLY HIGH-GRADE WORK DONE.



Do You Use Western Pads?

If Not, Why Not?

Did you ever stop to consider what the name "Western" means in connection with "Pads"? If you have not, we want to say right here, Mr. Horseshoer, that "Western" stands for "Quality, Design and Freedom from Freak Ideas."

**Use Western Pads and be up to date
First Rubber Company**

Sole Manufacturers
156-158 Lake Street Chicago, U. S. A.



A PERFECT WORKING MODEL
IN MINIATURE OF
THE LARGE WRENCH USED BY EVERY
MECHANIC. EACH PART ACCURATELY PRO-
PORTIONED AND MADE EXACTLY TO SCALE.
HANDSOMELY NICKEL PLATED.

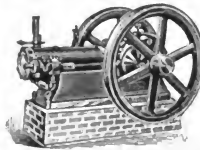
THE DAVISON MANUFACTURING CO. 112 FRONT ST. BROOKLYN, N. Y.

ON PAGE XXXI

Is an announcement of great
importance to every reader.

See Inside Rear Cover

Act Promptly



OUR gas or gasoline
engines are just the
thing to run your plant.
Highest efficiency, low-
est cost of operating,
18 sizes, Vertical or
Horizontal.

Lowest prices. Thousands in
operation. Highest award at
every exposition shown. We are
positive we can save you money. Write us and we will be glad
to send you proper catalogue and prices. Mention sizes you will
need or the number of machines you wish to operate.

LAZIER GAS ENGINE CO.

Ellicott Square, Buffalo, N. Y.

PATENTS that PROTECT
72-p. Book Mailed Free
R. S. & A. B. LACEY, Patent Att'ys, Washington, D. C.
ESTABLISHED, 1869.

Bolster Springs

ALSO WAGON SEAT,
TRUCK AND PLATFORM SPRINGS



Sold by leading Jobbers, or write us
HARVEY SPRING CO.
RACINE JUNCTION, WIS.

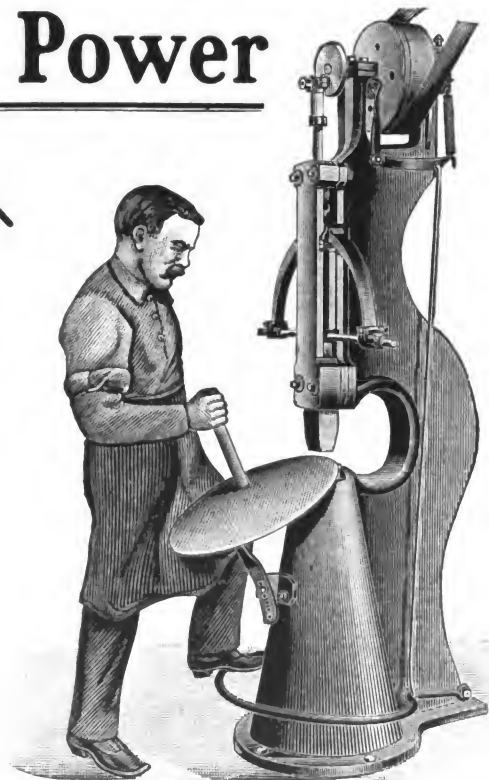
The Perfect Power Hammer

Is not only best adapted for plow
work and general job work, but has
an attachment, herewith illustrated,
for sharpening Harrow and Plow
Discs, that is not found on any
other Hammer.

WRITE FOR PRICES.

On Exhibition, Palace of Machinery,
Block 3,
World's Fair, St. Louis, Missouri.

Manufactured by



Macgowan & Finigan Foundry and Machine Co.
St. Louis, Missouri.



BUY THE BEST

Ask your dealer to show you

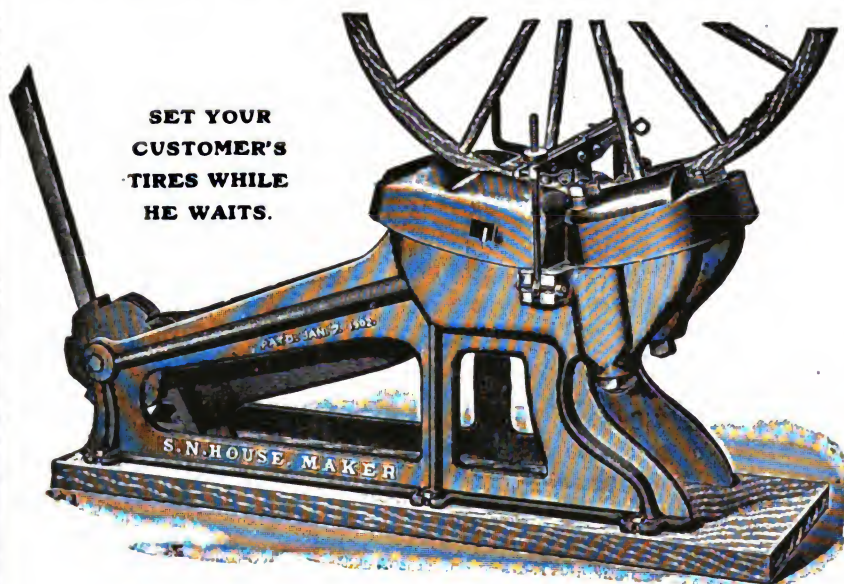
THE TRENTON

"It rings like a bell"

Manufactured by **THE COLUMBUS FORGE & IRON CO.,** Columbus, O.

Sole Sale Agent **HERMANN BOKER & COMPANY,**
101 Duane Street, New York City.

The House Cold Tire Setter



SET YOUR
CUSTOMER'S
TIRES WHILE
HE WAITS.

Is On

Exhibition

at the World's Fair, located in the Transportation Building, middle door, western entrance, where exhibitions are given of its

Wonderful Work

and which you are most cordially invited to witness and see for yourself that it is

**The Most Valuable
Tool Ever Invented
For a Blacksmith**

Manufactured by

S. N. HOUSE

THIRD and CLARK AVE.
St. Louis, Mo., U.S.A.

Macgowan & Finigan Foundry and Machine Co.

Selling Agents

41, 42 and 43 Gay Building - - - St. Louis, Mo.
Arkansas, Colorado, Illinois, Indian Territory, Indiana, Iowa, Kansas, Kentucky, Missouri, Oklahoma and Tennessee.

AN AXLE

*Which is coming into favor
again is here illustrated, the*



**Stivers
Long Swell**

We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

If you wish further particulars
Write to the

DALZELL AXLE CO.,

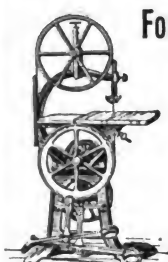
South Egremont, Mass.

FOOT, HAND AND POWER Wood-Working Machinery

For Working Wood in Any Manner

Wood-workers without power can successfully compete with large shops by using our labor saving machinery.

One man with our machines will do the work of four to six men using hand tools; will do it easier, will do it better.



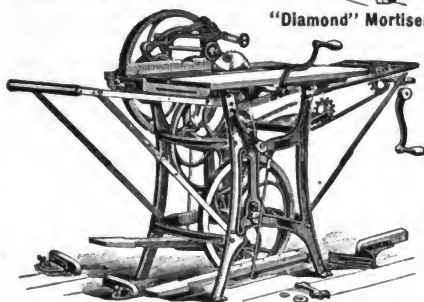
20-In. Band Saw.



"Diamond" Mortiser



"Victor" Scroll Saw.



No. 5 "Union" Self-Feed Rip and Cross-Cut Saw.

We guarantee each machine to be thoroughly practical and accurate. Machines sent on trial, and if they fail to give you entire satisfaction, may be returned at our expense. Better Investigate!

Send for Catalog A.

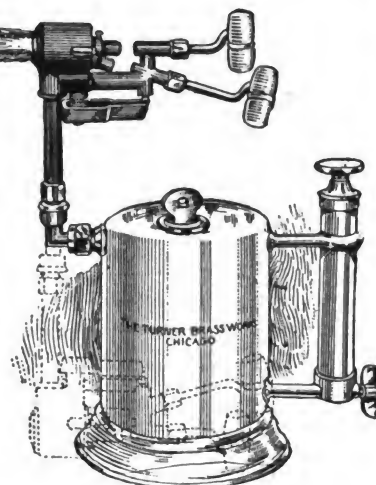
The Seneca Falls Mfg. Co.

274 Water St., Seneca Falls, N. Y., U. S. A. (92A)

Hottest on Earth

Turner Double Jet Gasoline Torches

are superior to all others for work requiring high heat, such as Brazing, Tempering, Annealing, etc. They have been the Standard for 7 years with Rubber Tire Workers.



No. 4 B Torch, \$4.50 each.
Capacity, 1 quart. Weight, 4½ lbs.

Send for Catalogue.

THE TURNER BRASS WORKS

63 No. Franklin St., CHICAGO.



TRADE MARK



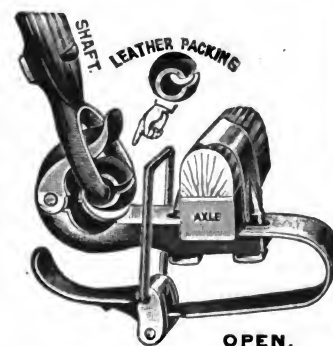
Our Trade Mark Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.

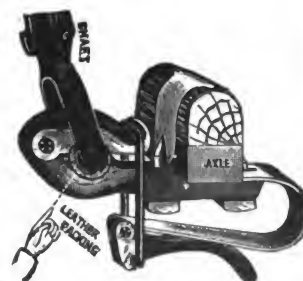
A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best Couplings on the market.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,
Syracuse, New York.



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CLOSED.

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A FEW MINUTES

IS ALL IT TAKES TO SUBSTITUTE MY

PATENT SINGLE RUNNERS

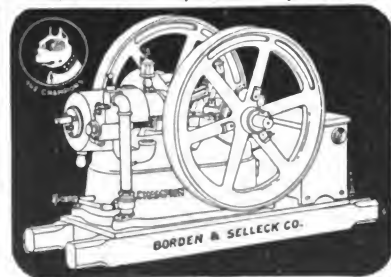
for the wheels of a Road Cart. They make of it the cheapest Speeding Sleigh possible. No one who has tried this combination one would look at anything else in the shape of a Sleigh for Speed.



Made for All Wheel Vehicles. Write to
JOHN E. HOBBS, North Berwick, Me.

CHAMPION

2 and 3 H. P.
Gasoline Engines
None Better at Any Price. Fully Guaranteed.



FLOOR SPACE 51" x 31" x 31" HIGH

Water or OIL COOLED. SIMPLEST. Fewest parts. Never gets out of order. Easiest to run. Best engine built for Blacksmiths.

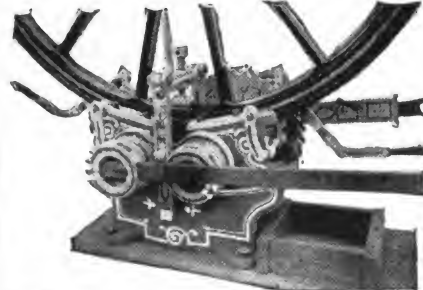
Sent on 10 days' trial to responsible parties. Money back instantly if not as represented.

Our Bulletin 12 is full of information. Write for it.

BORDEN & SELLECK CO.

51 & 53 LAKE ST., CHICAGO, ILL.

WE WANT YOU TO SEE IT AT WORK



If you have not seen our great exhibit at St. Louis of

THE BROOKS

COLD TIRE SETTER

in actual operation, we want you to write us at once for complete descriptive circular and terms of sale. We will show you one and guarantee it to be as represented or the trial will cost you nothing.

The Original and only Complete Hand Power Edge Grip Cold Tire Setter for re-setting light and heavy tires.

The Brooks Tire Machine Co., 121 North Water St. Wichita, Kan.

WILLIAMS, WHITE & CO.

MOLINE, ILLS., U. S. A.

This is no **CHEAP PRICED** hammer, nor cheap built hammer. This hammer is built for service, with all the adjustments and conveniences, of selected materials, high grade workmanship. Hard hitting, heavy, quick running. It will outlast your engine. Double faced frictions ground to a fit give perfect control of blow. Built with rubber cushioned levers instead of steel springs to order.

We also make Punch and Shearing Machines, Bulldozers, Benders, complete outfits for wagon and carriage smith shops. . . .



BUFFALO ^{No.} 604 FORGE



BUFFALO STEEL PLATE FORGE
No. 604

SPECIAL OFFER

BLACKSMITH readers by making an offer that no one can afford to pass by. To the first blacksmith in every County in each State and Territory of the United States who orders

This machine, the latest improved Buffalo No. 604 forge, was first announced in the October AMERICAN BLACKSMITH. Since then hundreds of blacksmiths have written, asking about them. The many splendid advantages, such as large capacity and strong, durable construction, excited the greatest admiration.

Now, **for thirty days only**, until December 1st, 1904, we are going to test the buying ability of AMERICAN Blacksmith readers by making an offer that no one can afford to pass by. To the first blacksmith in every County in each State and Territory of the United States who orders a Buffalo No. 604 forge, we are going to give one of our fine No. 66 or No. 68 Buffalo Blacksmith Drills **absolutely free**, as a present. Mind you, only one smith in each county—the one whose order reaches us first—gets a drill free.

The price of these drills is \$10.00 each. The total number of counties in the United States is 2,816. If one blacksmith in each county accepts this offer, we shall have to give away \$28,160 worth of drills. We can afford to do this, because the superior merits of each forge that we put out in this way is sure to bring in orders for others. A Buffalo No. 604 forge in each county would be the very best kind of an advertisement for introducing this new line of forges. Then, too, we prefer to give the blacksmiths the benefit rather than spend money in printed advertising matter. We know every blacksmith who gets a Buffalo No. 604 forge will praise it so, that his brother smith will buy one. Take this advertisement to your dealer, and he will fill your order; or you can buy direct if you prefer.

IF YOU WANT A DRILL FREE, YOU MUST ORDER OF YOUR DEALER OR MAIL YOUR ORDER TO US BEFORE DECEMBER 1st.



Buffalo
No. 66
Drill

The Buffalo Forge No. 604 is acknowledged to be the finest forge for general blacksmith use ever built. It is strong, rigid, compact and unbreakable. No other forges made have such **high power, large capacity and rapid-heating qualities**. The blower works easier, will not wear out, requires less attention, and gives a **stronger blast** than any other ever made. Read what we say below about this blower.

The fire pan, tuyere, coal and water boxes of this forge, each part, in fact, is new in design and thoroughly up-to-date. Each machine is sold subject to satisfactory test before paying for it. Your dealer will fill your order for one of them on this trial basis.

Durability, strong blast and easy running are the features of the Buffalo No. 200 Hand Blower used on the No. 604 Buffalo forge. This blower represents the greatest possible advance in hand blower construction, beyond which there can be no improvement. It is of the most simple design. Nothing but the finest material and the most superior workmanship enter into its construction.

This Guarantee Goes with Each Machine

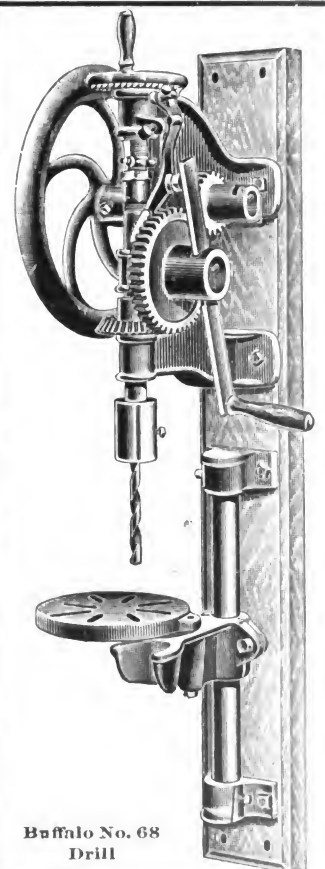
We will replace without charge any repairs caused by wear, for five years. We guarantee this blower to outwear any other on the market. We guarantee it to produce a stronger blast with the same number of turns of the crank per minute, and with less power, than any other hand blower built. There are many geared hand blowers on the market, but what maker offers such a sweeping guarantee covering durability?

Buffalo Blacksmith Drills, Nos. 66 and 68, are superior machines in every respect. Cut gears are employed. The design, material and workmanship are of the best. They both have automatic feed, and will drill holes up to one inch in diameter in center of fifteen-inch circle.

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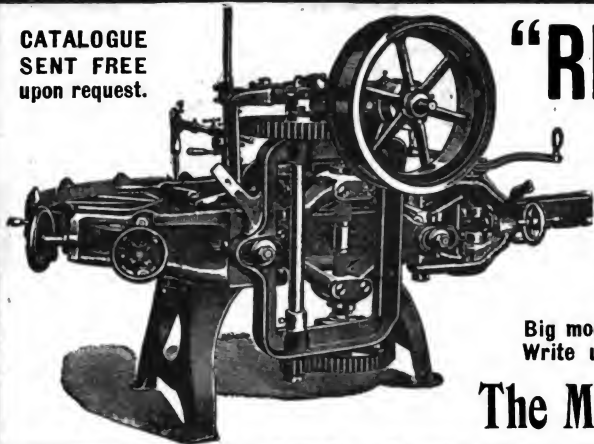
Have you our handsome new catalog of forges, blowers, drills and blacksmith tools? — Drop us a postal for it.

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BUFFALO, N. Y., U. S. A.



Buffalo No. 68
Drill

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"RIGHT CONSTRUCTION"

and "METHOD OF OPERATION" "tells the tale" when you put any machine into actual operation.

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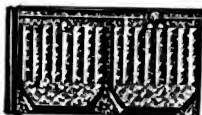
It upsets the tire "uniformly" **THROUGHOUT THE LENGTH** of the circle, making it possible to give to the wheel a "uniform dish."

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will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and Tempered by a Secret Process.



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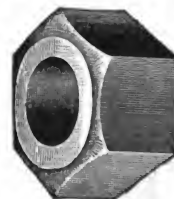
Ground, Tempered, and all ready for the handles, either round or riveted, for **15 cents each** or **\$1.50 a dozen**. All sizes from 5-inch to 8-inch. These blades are made from Sanderson Steel and **warranted**. Will replace any imperfect knife with two new ones. Handles all ready to put on, **one cent each**. Hand Forged Razors, ready to use, 10c. each; Pocket Knife Handles, in great variety, 10c. Try a sample. **Hundreds of Smiths are using these blades and make money and friends selling them. Liberal discount in quantities. Address**

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FOOT POWER HAMMER

THE C. E. SUTTON COMPANY

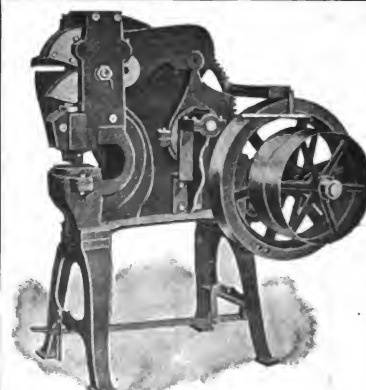
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Best material and workmanship.

Write for bulletins.



BLACKSMITH PUNCH



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is the name of our Bargain Sheet issued the first of each month. We started it about a year ago and

"SPECIALS" is becoming "IT"

Our customers look forward to getting it and we see that they get it. "SPECIALS" is filled with

REAL BARGAINS

in goods you are needing—not goods out of season—and it pays to be on "SPECIALS" List. The more names the better for us—the more the merrier—so we have decided to advertise it and bring the list up to 10,000.

No charge is made—"SPECIALS" is free to all blacksmiths and we earnestly hope you will place your name on the list so that we can send you **"SPECIALS" EACH MONTH.**

It's up to you to buy as cheap as you can—we show you how and ask that you take a postal—today—put

E. H. COOMBS CO.

Fort Wayne, Ind.

on one side, say "SPECIALS" and sign your name on the other, send it to us and the thing is done.

Don't say "Zu Zu to the Grocerman," say "Specials to Coombs." AND SAY IT TODAY.



DON'T TURN YOUR BACK ON A GOOD THING.

SEARS IMPROVED PUNCH AND SHEARS

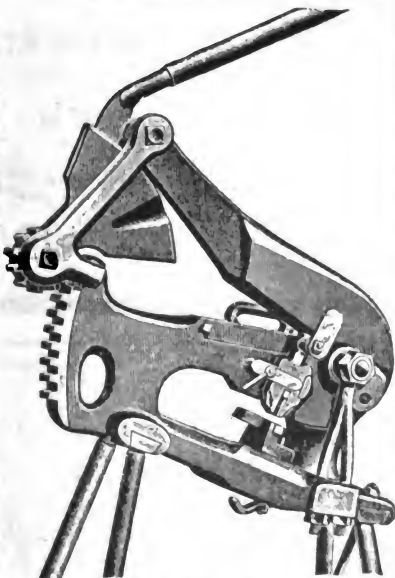
WE herewith present to the readers of THE AMERICAN BLACKSMITH our improved Punch and Shears, a machine that we guarantee to be the **most powerful** and **handy** of any punch and shear on earth for jobbing and wagon shops. This machine has no equal, as it has a power of 88 tons on punch with a man weighing 150 pounds on a 4-foot lever. It will punch a $\frac{1}{2}$ hole in $\frac{1}{2}$ iron, will shear iron $\frac{1}{2}$ by 4 inches wide, and will cut off 1 inch round iron. The above work is done with ease.

OUR GUARANTEE

We guarantee our Punch and Shears to do the work as stated above, and will give \$200.00 to anyone who will show a Punch and Shear that will compete with ours in a jobbing or wagon shop.

We are the only firm that advertises the length of lever it requires to do the work of these machines, and would suggest before buying a Punch and Shears to find out the length of lever it requires to do the work advertised.

SEND FOR CIRCULARS AND PRICE LIST



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The J. D. Hammer

Built especially for carriage and repair shops.

A Foot and Power Hammer Combined

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All heavy work, such as welding stubs, heavy machine work and sharpening plows can be done on this hammer. Iron $8\frac{3}{4}$ inches square may be cut, or you can upset an iron 10 inches long, as hammer strikes the same blow 10 inches above the anvil as it does on the anvil. Strikes about 800 blows per minute.

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This hammer, may be instantly and easily changed from belt to footpower. For welding, rounding, flattening, swaging, cutting iron or any place you can use a helper, this hammer is always ready. It will strike as hard a blow with foot power as it will with the belt, only not quite as fast.

DO NOT BUY A HAMMER

that you can't get a stroke out of without starting an engine. The J. B. is the best all around hammer. None better for plow work. Twenty inches between dies when hammer is at highest point.

Any tools that are used on anvil can be used with this hammer. Shipping weight 1400 lbs.

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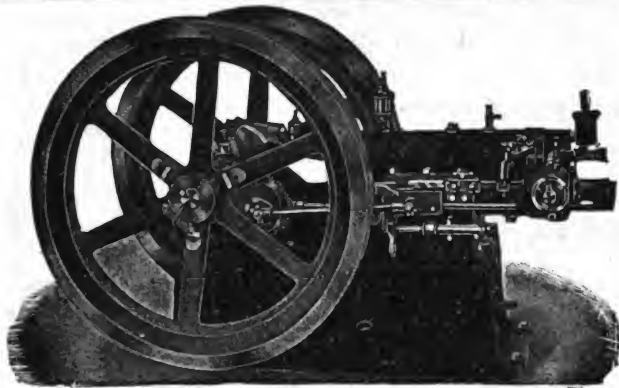
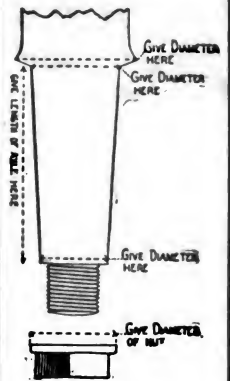




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**Steel Truck Wheels to Fit Any Wagon
TRUCK WAGONS
Steel Wheels for Any Purpose**



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Man power is costly. It is poor economy to try to do work that you can make an engine do. The Gemmer Engine will more than pay for itself the first year it is in your shop. Our 2½ H. P. has been brought out especially to meet the requirements of the blacksmith and for similar work. It develops four actual H. P.

THE GEMMER COSTS LESS TO RUN

than any other engine made, using less than 1-12 of a gallon of gasoline per H. P. per hour. Its superior economy has been repeatedly demonstrated in competitive tests.

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To prove the truth of our claims, we will ship any size engine and allow you

Free Trial at Your Own Work.

If not as represented and first-class in every respect it may be returned at our expense. WRITE FOR CATALOGUE.

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A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.

"CHICAGO" WHEELS save time.

They're made of stuff that cuts.

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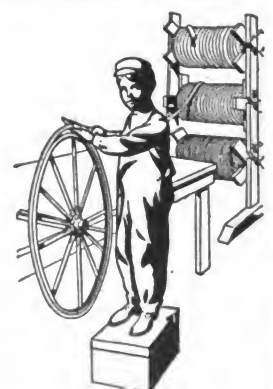
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THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

NOVEMBER, 1904

NUMBER 2

BUFFALO, N. Y., U. S. A.

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Lien Law Legislation.

Attention is especially directed to the paragraph on Lien Laws, page 31, of this issue. Laws for protecting the labor of blacksmiths are needed in almost every State. With the sessions of the legislatures so near at hand, time is propitious for an agitation of the matter. What will your action be?

If a candidate for the State legislature asks you for your ballot on election day, ask him if he will vote in favor of a bill for a blacksmith's lien law. Get promises of support upon such a measure from each candidate who desires your vote at the polls, and then advise the American Association of Blacksmiths and Horseshoers.

Get Your Subscription Extended.

In no way can any one reader extend the usefulness of this paper and increase the good it does better than by securing at least one new reader for it. Our recent offer of six months' credit upon the subscription account of anyone who would send us an order from a new reader, has proved so popular that the date limiting the offer is to be extended to January 1, 1905. We want each reader to get just one other craftsman

to take the paper before that time. It isn't asking much, and in return we extend your own subscription six months. Show your brother smith one of our copies; tell him how you like the paper and get his order. You can offer him one of our 1905 calendars in addition, free. Remember the date. Will you get one new subscriber for us before that time?

Have You Been Heard From?

During the volume recently completed THE AMERICAN BLACKSMITH published items upon a wide variety of shop topics from over five hundred blacksmiths and wagon builders located in all parts of this country, as well as Canada, England and Australia. This was in addition, to the articles from our staff of well-known contributors. We greatly desire, during the coming volumes, to publish at least one short item from every single one of our shop readers. THE AMERICAN BLACKSMITH is published for its readers. We want them to take a more active interest in the paper to the extent of sending in for publication a brief item from their shop experience every now and then. Make it concise, a few sentences, if that will tell the story, and we will put it into shape for publication. Send a shop photo, a list of your prices, a description of some interesting job or details about a new tool or new method you have discovered. Make THE AMERICAN BLACKSMITH your paper, and don't let a year go by without something appearing in the columns under your signature.

Calendars for Smith Shop Advertising.

Doubtless all readers of THE AMERICAN BLACKSMITH are familiar with the offer we have made to furnish lots of fifty or a hundred 1905 calendars, to be used by them for advertising their shops. The calendars are handsome ones, and bear no advertising matter except the name and address of the purchaser. Full particulars are given on page XXXI. Our desire here is to remind those who intend to order, but have not yet done

so, that they have no time to lose. Just as we anticipated, our readers recognized the value of the offer. It became extremely popular immediately upon its announcement. Orders flowing in each day bid fair to exhaust the supply early, and when they are all spoken for no more orders can be taken. We should hear from all who want fifty or a hundred not later than November 20th, and even that date may be too late. Better order at once.

We especially urge that readers take advantage of the opportunity for renewing their subscriptions at this time for two, three or four years, at considerable saving, by combining a calendar and subscription order. Refer to page XXXI for full details. For instance, fifty calendars and four years' credit on your subscription comes to but four dollars. Take this rare opportunity to get your paper paid for well in advance. But prompt action is necessary if you don't want to be too late for the calendars.

Comments on Making Tools.

C. M. S.

Do not think by this heading that you are going to get any new ideas on tool making, for that is not our purpose this time.

We want to say a few words in regard to the pernicious habit of many blacksmiths, machinists and others, of making tools for themselves during working hours, using the steel and other materials belonging to the concern they are working for. Many mechanics get the idea into their heads that a tool, or anything they make belongs to them, even though they make it during working hours not belonging to them.

The writer well remembers an incident which happened several years ago in a shop near Boston. The proprietor, a stiff, old fellow, well known as the "old man," in going through the shop one day, chanced to pick up a nicely finished hammer which he noticed on a bench. He looked the hammer over critically and said to a young man near by: "Is this your hammer?" The

young man replied, "Yes, sir." "Did you make it?" "Yes, sir." "It is a pretty nice hammer." Taking up a fancy screw driver, he said: "Did you make this?" "Yes, sir."

The young man thought this an opportunity to show his handiwork, and perhaps make an impression on the "boss," so he showed him numerous hammers, wrenches, and other tools he had spent lots of time on. The old fellow looked them all over with much interest and remarked: "A pretty good lot of tools, young man." After asking the young man's name he passed along. He went directly to the foreman and said "You let Jim Blank go Saturday night." The foreman was surprised, and asked the reason for his discharge. The "old man" answered: "He has got too many fine tools which he has made at my expense; and, furthermore, the first man you see making a tool for himself you let him go at once, no matter who he is." There was no more private tool making in that shop.

It is not a good recommendation for a man to have a lot of fine tools, for the chances are he has made most of them on the "boss' time," and from material belonging to the concern.

How often we have seen the men in the shop making something "on the sly;" stealing (yes, *stealing* is the word) a few moments time to do a little when the "boss" wasn't looking. This is every way as wrong as though he had actually stolen a tool, for no part of it belongs to him. We refer, of course, to men working by the hour or week, still, it is about as bad for piece workers, for generally everything but the time belongs to the proprietor.

On a few occasions, a *very* few, we have known men to pay for the material when making a tool, in man fashion.

When one can buy any kind of good tools for so little money as he can now, it is a shame to spend the time he is getting paid for in fussing over a hammer, a wrench, or some other tool. Don't do it boys; put your time in honestly on the work you are getting paid for doing, and don't steal either time or material.

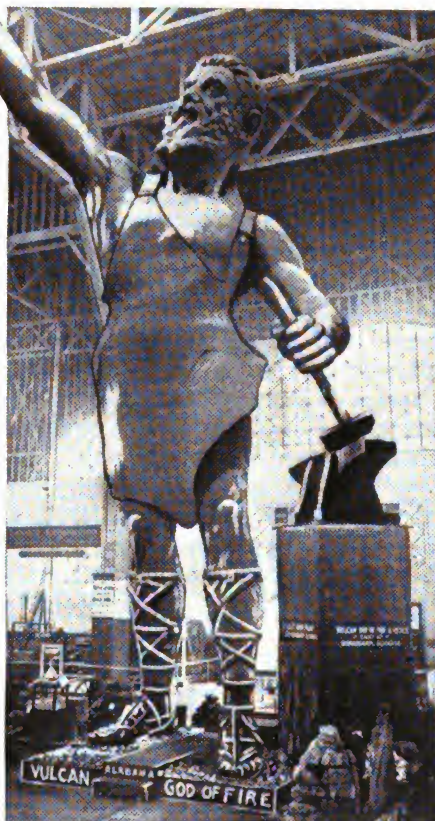
Vulcan—God of the Smithing Arts.

Standing in the Palace of Mines and Metallurgy, at the World's Fair in St. Louis, weighing over 100,000 pounds, and his head towering 56 feet above the

exhibits, is a monster iron statue representing Vulcan, "The God of Fire, Smelting and the Smithing Arts."

This gigantic statue is so enormous that a team of horses can very easily pass between his feet and as told in these columns before, seven freight cars were necessary in transporting him to St. Louis, his head which weighs 15,000 pounds, occupying a car alone, and his feet, which are each six feet long, also occupying a separate car.

Some idea of the gigantic proportions of this Colossus can be gotten from the following dimensions: Head, 7½ feet high and 7 feet wide; length of arms, 10



THE GIGANTIC STATUE OF VULCAN AT ST. LOUIS.

feet; width of shoulders, 10 feet; waist, 18 feet 3 inches; calf of legs, 4 feet 3 inches; ankle, 2½ feet; the weight of the hammer held in the left hand is 300 pounds; the spear in the right hand, 250 pounds, and the anvil block weighs 6,000 pounds. This monster cost \$20,000 and took almost a year to complete.

Well-known Figures in the Blacksmithing Craft.—2.

E. W. Perrin was born of English parents in a tenement, in London, England, some 48 years ago, the fifth son of a family of twelve boys and girls. His father's position in life was that of a wage-earner with a larger family than his income would support, so that his recollections of home life as a boy are

marred by the cruel keen struggle for existence. The story of Mr. Perrin's varied experiences, as told in his own words, may be of interest to our readers:

At these times, in England, as there were no public schools the cost of educating a child was paid by the parents direct, the result being that a wage-earner with three or four children of school age could scarcely afford to give his children more than the mere rudiments of education, and hence it was that I began as a bread-winner when I ought to have been at school.

At nine I started as an errand boy in a grocer's store at the munificent salary of a half crown (60 cents) a week. After that I worked as page boy, doctor's boy, baker's boy and news boy, and as I reached my teens, began to learn the wood-work trade, making piano fronts with a fret saw. Then I worked in the decorative department of a picture frame shop, and here developed a taste for drawing, making new designs for cornices, etc.

I had begun to attend night school when business became very dull in London and I couldn't get work at anything. To be in that veritable hive of humanity, with its 6,000,000 people, without money, you might as well be a dog in the wilderness. One morning, meeting a sergeant of the British Hussars, I accepted the Queen's shilling.

Though detesting anything that suggested war, I was hungry, and it was either steal or beg—so I enlisted to get something to eat, but I realized in later years that this was a great blessing to me, for it enabled me to get an education, as in the British army, education is absolutely compulsory. In addition to gymnasium, horse riding and sword drill, I went to school to drill my intellect. As soon as I got through my manual training I went into the forge to learn to shoe horses. I was then 18 years old, learned rapidly in the forge and was promoted to the rank of shoeing smith. My duties as shoeing smith took me to the infirmary stables to assist in the treatment of sick horses, and here I saw a great field of study, with possible promotion to the rank of sergeant farrier. I took advantage of the library to read every possible thing on equine anatomy and pathology, on materia medica, botany and chemistry. I then made charts and dissectible models of the horse's foot and leg, and gave a course of lectures on the anatomy and pathology of the foot and leg. I still kept up my schooling at night and finally got a second class certificate

of education and was promoted to the rank of ~~Sergeant~~ farrier. In 1885 I was sent to the British army veterinary school for a course of instruction, from which I returned with honors. During my course at the school I lectured to the students at night, to coach them in their examinations. By this time I had read all the leading authorities on horse shoeing, and had become an expert at the practical part of the business, and my rank as farrier afforded splendid opportunities for the study of veterinary therapeutics, of which I made good use.

About this time my regiment was drafted to Ireland, and I was compelled to be a party to that most inhuman act of putting people out of their homes—eviction duty. I felt the gross injustice of it very keenly. Turning my attention at this time to the army rules and regulations, I discovered some wholesale frauds and misappropriations of public property. I knew the risk of trial by court martial, and certain conviction, if discovered in giving these facts to the public, but I could not resist the temptation, so I wrote my first article on public questions under the name of "Solon," to "Reynolds," a paper in London with some half million circulation, on condition that they would not make my name public. These articles caused a sensation in military circles. I also wrote a number of articles for "Justice," the organ of the Social Democrats. I still kept up my studies in veterinary medicine and scientific horse shoeing, writing many articles for various journals, and keeping up my schooling at night, looking to that coveted prize, a first class certificate of education and the promotion to the rank of farrier major. While in Dublin I attended a course at the school of arts in the modeling department, and also ventured an article in the *Army Gazette* over my own signature, for

which I was severely censured. My twelve years' service was drawing to a close, and as I had become a "marked man," to be court martialled the moment they could get the necessary evidence, I was glad to leave the army.

Having saved a little money, I purchased a veterinary practice and horse shoeing business combined in Bath, England. The practice increased, but I soon tired of the constant night work, though I made money. This, however, was not the only object I had in view,

on the farms and were doing no better than I. I gave it a fair trial—five years—then gave it up. We decided to change quarters, so when we got a letter from somebody in Arkansas, who said little children ran bare footed there in midwinter, that settled it; the die was cast. We "packed our turkey" as they say,—didn't sell the farm, as it was mortgaged, but just got up and left, drove to town and bought tickets to Little Rock.

It was zero as we came through the

Dakotas, but when we got to Arkansas the peach trees were in blossom, and the hills were clothed in green; this to us was a veritable paradise. Starting in search of work but getting none, I found a horseshoer who wanted to sell out, gave him what he asked and set up horseshoeing again. The horse-owning public of Little Rock were quick to recognize ability, and having cured a number of cases of foot lameness simply by a scientific method of shoeing, my reputation became firmly established. Here again I began to write for the local press on public questions. I was persuaded to run for the office of mayor on an independent ticket, and was defeated. At this time I wrote three pamphlets, one on street railways, one on waterworks, one on electric light plants. I also became a contributor to the *Horse Shoers' Journal*. I had always



MR. E. W. PERRIN IN HIS SHOP.

and so in 1888 we sold the veterinary practice, took passage on an Allen liner, landed in Quebec and then took a train 2,000 miles to Manitoba. We bought a farm and settled down to make money, but I soon got acquainted with a beef trust, an elevator trust, an implement trust and in short, I found that I had to sell to a combine and buy from a combine. I worked from sun up to sun down, but it seemed the harder I worked the further I got into debt. I knew nothing about farming, but many of my neighbors were raised

been an advocate of technical schools for the purpose of educating and instructing the horseshoer in the practical part of his art, and thinking that I could persuade the Master Horseshoers' Protective Association to take this matter under advisement, I wrote a pamphlet looking to the consummation of my plans. A board of scientific instruction was appointed, of which I was made chairman, but owing to the lack of interest taken by the master horseshoers the plan was never put into practical operation. (I have yet many

copies of this pamphlet which any reader of *THE AMERICAN BLACKSMITH* can get by sending cost of postage.) I still believe that my proposed plan is the only practicable method of turning out scientific horseshoers. In 1901 I began to write my first series of articles for *THE AMERICAN BLACKSMITH*. I also lectured frequently in this State on political and industrial topics.

Casual observers often wonder how I found time to shoe horses for a living, to improve my education, and yet to write and lecture. I did it by working 17 hours a day. For years I have written the foundation of my articles

wealth of a thousand Solomons cannot buy. I simply tried to embrace the opportunities that came my way. Each individual is endowed with mental capacity that would fit him for some useful occupation, but no amount of cultivation will develop a plant from ground that does not contain the chemical elements necessary to its growth, and no amount of cultivation will develop intelligence in a head that contains but little brains. To produce the best results the fertile soil must be sown with healthy seed, and surrounded by proper environment, the young plant must be protected from the contamina-

obstructing our mental vision and hiding the beautiful sunlight of truth from the mind. Accepted theory is the stumbling block of the ages, it is easier to learn a new truth than to unlearn an old lie. Hence we owe it to posterity that we teach our children nothing but the truth. It is of little importance what theories we profess, for all theories die, only truth is eternal; more lasting than the universe, those who dare to tell it are the beacon lights of the human race. No nation is truly great whose people are bound by the fetters of ignorance. Knowledge is power. To those who diligently seek the truth,

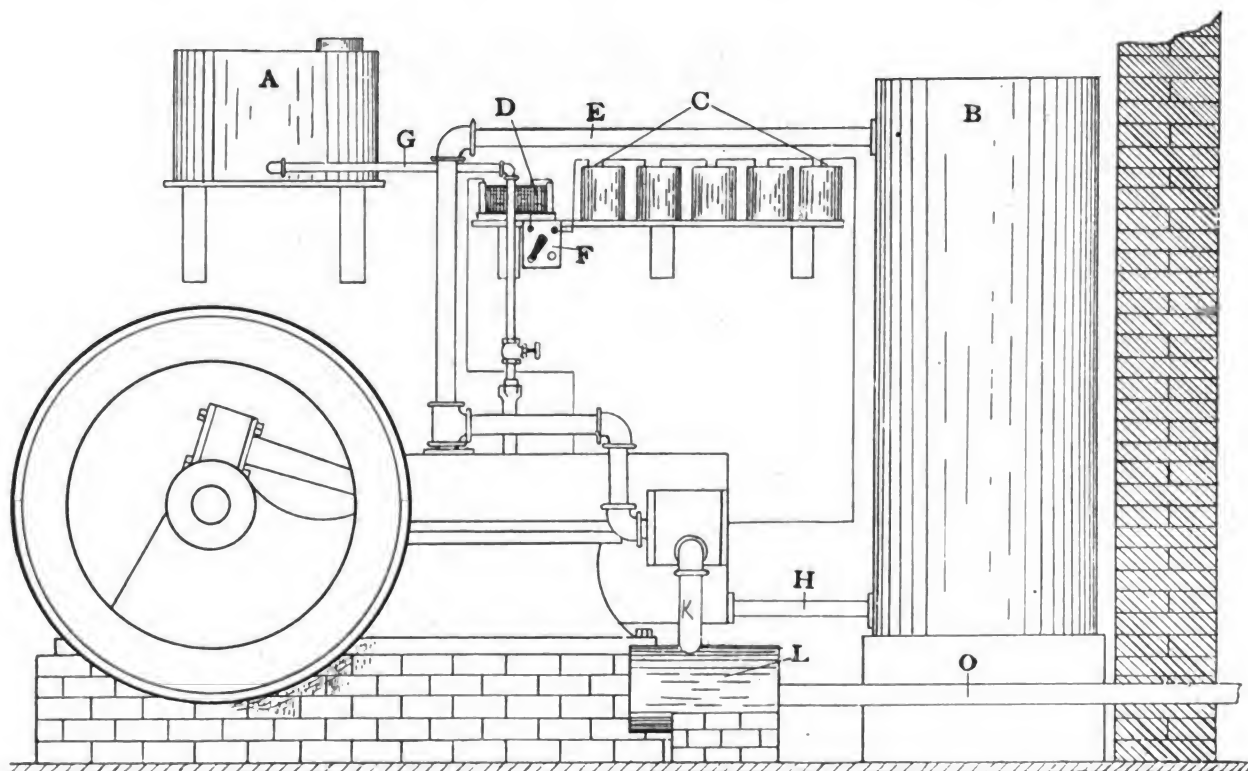


Fig. 1—A REPRESENTS GASOLINE TANK; B, WATER TANK; C, BATTERY; D, SPARK COIL; E, PIPE TO CARRY WATER FROM ENGINE; F, BATTERY SWITCH; G, PIPE TO CARRY GASOLINE TO ENGINE; H, PIPE TO CARRY WATER TO ENGINE; L, EXHAUST POT; O, EXHAUST PIPE.

while at work. I keep a tablet nailed to the wall where I can reach it while pulling the bellows; on this I scribble my notes as I think them out, I tear off the leaves when filled, take them home at night, and then after the children have gone to bed, I build the superstructure upon the foundation which I have laid during the day while at the anvil.

I claim no credit for what I have accomplished. Though born with some intellect, I didn't make it. It was the gift of a beneficent Creator. True, I cultivated it, but it takes energy to shoe horses all day and then study until midnight, but neither can man make mental energy. That also is a dower of Mother Nature—an inheritance that the

tion of weeds that would draw its growth, it must be fostered by the gardener's hand, nurtured by the dew of heaven and kissed by the eternal quiver of the sun; so also the fertile brain must be developed in proper environment; it must be kept from the contamination of the weeds of vice; it must be fed with wholesome food, for it is by nature's marvelous alchemy that food is transferred into thought. It must be fostered in the atmosphere of a good home; give it access to pure literature, let it be nurtured with the dew of human kindness, let it absorb the beautiful sunlight of truth. This is the best way to develop the best that is in us. There is no night so black as the darkness of ignorance, superstition hangs like a pall,

all light is given. 'Tis on the wings of thought we mount to heaven.

The Gas Engine.—3.

E. W. LONGANECKER.

Installation and Operation.

The matter of operating the gas engine begins with the installation of it. It should be given a place in the shop with plenty of light. If you want the best service it is capable of giving, keep it out of the dark corner. If this is the only corner available for the gas engine, put in a window or two. Better partition the corner off to itself. Make a room for the engine alone, and let the "merry sunshine" in. Arrange the room with a view to keeping nothing but the engine and fixtures necessary to it in the room, and so that it can be kept warm

in the winter time. A little stove in the engine room, fired up in cold weather, so as to warm up the air in the room, will obviate that "hard starting" problem "in cold weather," about which so much has been said and written. A gas engine should be so placed as to leave plenty of room around it. So often the very great mistake is made of placing the engine snug up into the corner or crowding it "smack" up against the wall. It is impossible to care for an engine properly if you can not, conveniently and easily, get to all its parts. No part of the engine should be nearer than two feet from the wall, and three feet would be better, so that a good

out of concrete, brick or stone laid up in cement and go down into the earth deep enough to make it firm. All this may seem unnecessary to many who are not precise or exacting in their work, but the old adage, "Well begun is half done," has a lot of truth in it. The foundation or anchor bolts should be of sufficient number and strength to hold the engine firmly. They should be long enough to extend down through the foundation to the bottom and fitted at the lower end with an anchor plate. The exhaust from the engine should be led to the open air with as short a pipe as convenient. Long exhaust pipes, with many turns in them should not be

ment and method of working of this little pump system, so as to enable him to quickly locate any trouble that may arise in its operation. It is easy to understand and to keep in proper working order if one has the least knowledge of hydraulics. It is good policy to have the return or overflow pipe of good size, say one size larger than the supply pipe, so as to allow a free and unobstructed return of any over-supply. The arrangement of cooling apparatus is one of much importance. The water cooling system is the one principally in use. And in blacksmith shops it usually consists of a barrel or tank so piped up to the engine as to use the water over and

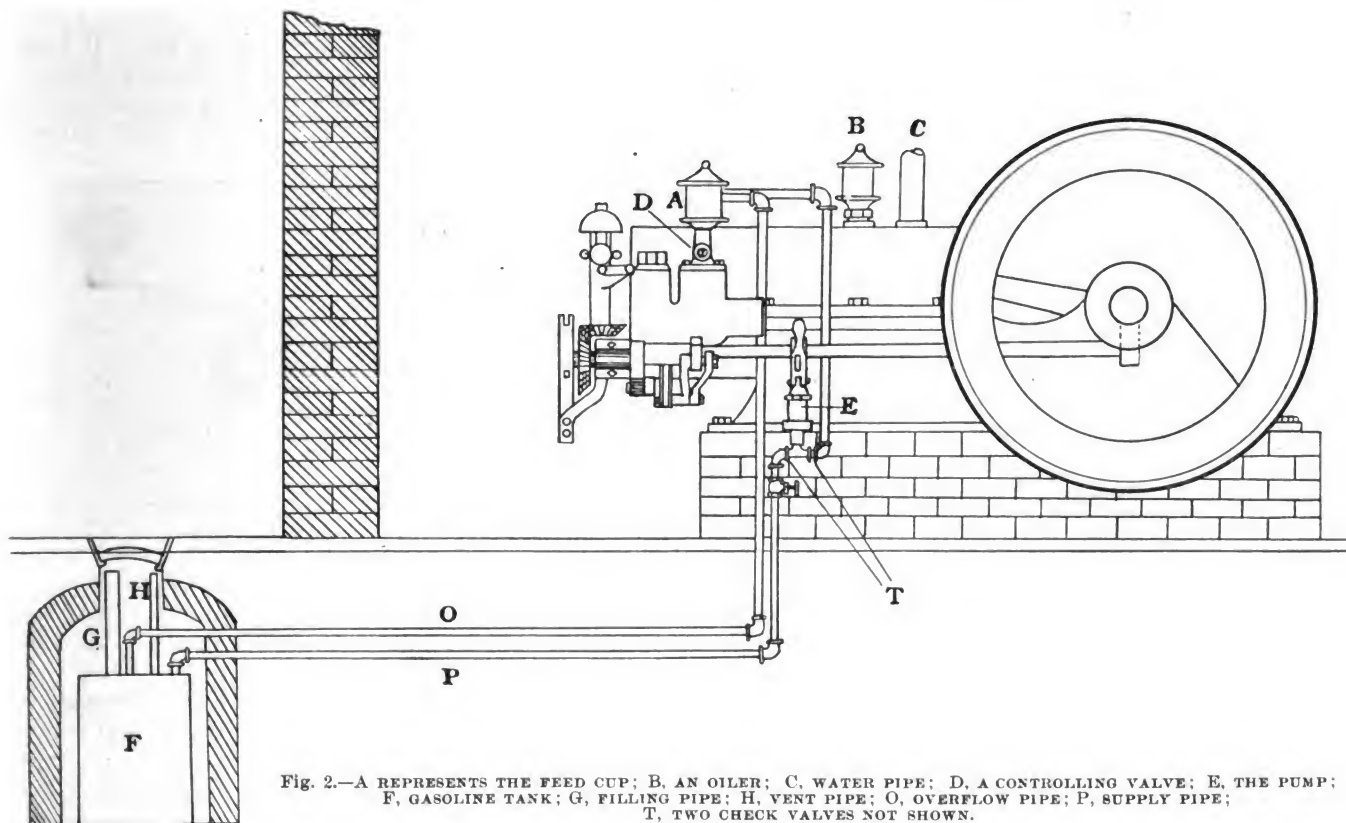


Fig. 2.—A REPRESENTS THE FEED CUP; B, AN OILER; C, WATER PIPE; D, A CONTROLLING VALVE; E, THE PUMP; F, GASOLINE TANK; G, FILLING PIPE; H, VENT PIPE; O, OVERFLOW PIPE; P, SUPPLY PIPE; T, TWO CHECK VALVES NOT SHOWN.

sized man can get between the wall and the engine for the purpose of doing any work or making any necessary adjustments to the engine conveniently. Many an adjustment is neglected or improperly done because of the inconvenience of getting at it.

Nearly all blacksmiths use their gasoline engines as a stationary power. They seldom have occasion to move them from place to place, consequently there is no excuse for a poor foundation under the engine. An engine can not do its best work or "live long" at hard work on a shaky foundation. The "jig dancing" engine always gives its attendant more trouble and goes out of operation much sooner than the engine on a firm foundation. Make the foundation

considered. If a muffler or exhaust drum is used it should be of large size when compared with the engine cylinder or its capacity. The end, if an exhaust pipe is standing straight up, should be protected against rain and snow by a tee and two short nipples in each end of the tee. According to insurance rules the gasoline tank must be located somewhere outside of the building and below the little reservoir on the engine so that any over-supply of gasoline may flow back to the tank in a return pipe. From the tank to the engine the gasoline is delivered by means of a small pump, usually connected to the engine, to which the supply pipe is attached. One operating a gas engine must know every detail of the arrange-

over by the process of a natural circulation from the tank to the engine through the lower pipe connection and from engine to tank through the upper pipe connection. It is therefore best to place the bottom of the tank on a frame or base, high enough to bring it (the bottom of the tank) on a level with the inlet port on the engine cylinder. The illustrations, Fig. 1 and 2, will show how all connections are made. Fig. 1 shows particularly the cooling tank connections, battery connections and gravity feed system for the gasoline, and also shows the method of connecting up the exhaust so as to get quickly into the open air with very short pipes. Fig. 2 especially illustrates the method of pump feed for the gasoline as required

by the rules adopted by the National Association of Fire Insurance companies. These illustrations tell practically the whole story of properly installing the gasoline engine.

The actual operation of the gas engine consists of properly starting, stopping, oiling and keeping it in fuel, water and adjustment so that it can perform its work to the best advantage. In starting a tube igniting engine, the secret in getting an easy start at all times is to heat the tube to a bright red so as to easily ignite the starting charges. After the engine is started the heat from within helps to keep the tube hot and the flame from the burner or torch can be turned down so as to keep the tube only at a cherry red. Both the outside and inside of the tube and the port leading from it to the interior of the cylinder must be kept open and free from scales and every bit of carbon accumulation.

The electric igniting engine often gives trouble in starting because the current is not strong enough to make a good igniting spark. We have found so many instances where this was the case that we feel it is of great importance for an operator to carefully study the electrical apparatus which constitutes the igniting mechanism on his engine. Different makes of engines use different styles of batteries or generators, as well as differently constructed igniters. Nearly all manufacturers have books of instruction that the operator should carefully study. In a general way it may be said, however, that the battery, magneto or dynamo, which is the source or generator of the current, may develop a current of sufficient strength and yet not be able to deliver it with force enough at the point of contact or igniter points, on account of some short circuit, dirty connection, broken wire, poor spark coil, or carbon covered points. All these things may be in first-class condition and the battery or generator may be too weak to supply the necessary current. These matters will be brought up again in an article on "Common Troubles," to follow in these pages. They are referred to here to show how important it is to know and thoroughly understand every item that has anything to do with the successful operation of the engine. A good big blue white spark is necessary to successful starting. Next to the want of a good spark, the supply of fuel in improper proportions is a source of much trouble. One who knows just how to supply the fuel for the first couple of charges, so as

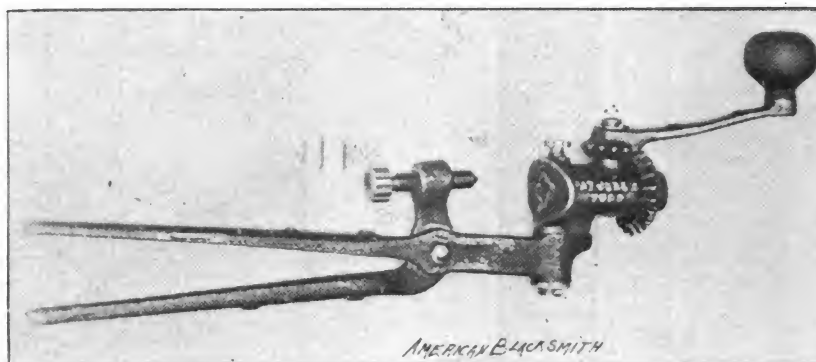
to always make an easy start, will not have much trouble with an engine. It is surprising to see how often persons, who have had the care of a gasoline engine for a long time, drown their engines by allowing too much gasoline in the start. Air overcharged with gas or gasoline as it enters the cylinder will not ignite, even with an excellent spark. The result is that one charge after another is drawn into the cylinder without explosion, and the engine is flooded or drowned with gasoline. Hard starting in cold weather has already been referred to above. The real cause for this is that gasoline will not readily vaporize and unite with air that is below the freezing point. Warm air vaporizes it and takes it up quickly. This is the reason why the fellow who keeps his engine room warm can always start his engine as easily in cold as in

attention at the proper time, would avoid it all. When an engine is stopped for the night it should be cleaned, the water drained from the cylinder and pipes, the oil cups closed and the battery switch thrown out. It should be left in the most favorable condition for its next run. Attention to details soon teaches one more than he can learn from books on the subject, and makes him a successful operator.

(To be continued.)

A Tire Bolt and Rim Wrench.

We show in connection with this article a picture of a tire bolt and rim wrench which has been placed on the market by a subscriber of the AMERICAN BLACKSMITH, who claims the following advantages for the tool: It holds the bolt while the nut is being removed; the nut socket working on a spring, will not mar the rim of a newly painted



A RECENT PATTERN OF TIRE BOLT AND RIM WRENCH.

warm weather. The proper oiling of an engine is very important to its successful operation. Our space in this article is too limited to more than hint at some of the important things to do. Every wearing part or moving joint where friction occurs should be regularly oiled, and as frequently as necessary, and not less than once a day the entire engine should be cleaned by wiping off all surplus oil and dust that has accumulated. A careful engineer, while rubbing up and cleaning his engine, notices the condition of all the parts as he goes over them. If he finds any of them worn or out of adjustment he attends to them at once by removing the cause to prevent further trouble. Cleaning and oiling carefully, gets one familiar with all the parts of his engine. It puts him in position to locate the first sign of trouble at which time it is most easily remedied.

An engine should never be allowed to run after it is known that any of its parts are out of order. Delay is expensive, dangerous and often causes a week's shut-down, when a few minutes'

wheel; it is easily adjusted to any size rim and is equally handy to run the nuts on or off.

The machine weighs about five pounds, can be very easily handled and with a little practice, eighteen nuts on a wheel can be removed in one and a half minutes.

The Operation of a Suction Gas Producer.

As the economical generation of power is essential for the industries, it undoubtedly will be of interest to the readers of this paper to hear about a new departure in power generation, which makes it possible to generate a power gas for gas engines directly out of coal or coke. As one pound of anthracite or charcoal is sufficient to develop 1 H. P. hour, it is evident that with a price of \$5.00 per ton for anthracite, 1 H. P. hour can be generated for $\frac{1}{4}$ of a cent, which is about one-half the cost of steam power.

Producer gas power plants are built for generating out of a suitable fuel a mixture of carbon monoxide and hydrogen which, if used in gas engines, allows

an exceedingly advantageous utilization of the fuel." Up to the present time producer gas has been generated in so-called pressure gas producers by evaporating water in a separate boiler and by leading the steam, mixed with air, through the glowing fuel, whereby the steam is decomposed into hydrogen and the coal burned to carbon monoxide. This mixture of combustible gases is led through a scrubber to a gas holder, and from there to the engine.

It is evident from this description that for generating gas by this method a boiler and a gas holder are required, which increases considerably the cost of construction and of attendance. These pressure gas plants are now being superseded by the so-called suction gas producer plants, which are much simpler

the fuel in suction gas producers is much higher than in pressure producers and is reaching 80% or more. By leading the steam under the grate the latter is kept cool and clean.

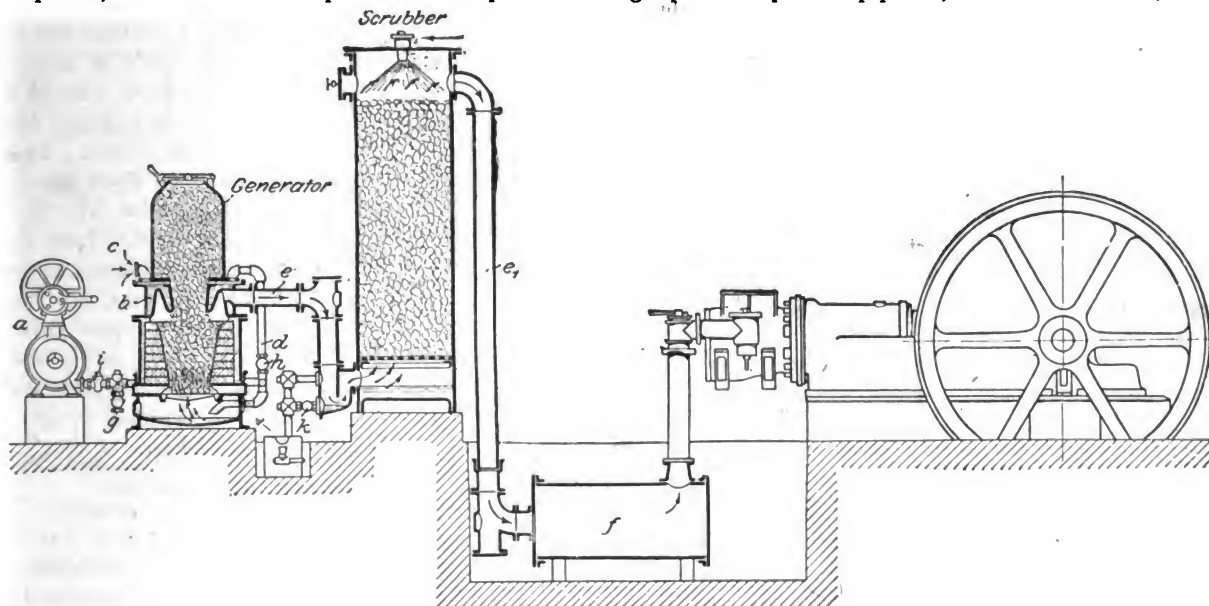
The transformation of steam into hydrogen and the formation of carbon monoxide is taking place so quickly that the producer is always making the amount of gas required, and is able to start suddenly from a low to a full load.

The advantages of suction gas producer plants are: Automatic generation of the gas by the engine; highest and best utilization of fuel; no boiler and no gas-holder is required; can be erected without danger in any convenient place; easy to start and to run; no soot, no smoke, no odor; no explosion possible; small floor space required.

A complete suction gas producer plant

it is cooled and purified from the dust and tar. From the scrubber it goes through a small equalizer.

Before starting the engine the fuel in the producer has to be heated up by means of a small hand blower, "a," attached to same until the gas is burning well. For this about ten minutes are required. When this point is reached the hand blower is stopped and the engine started in the usual way. The engine is now drawing, by her own sucking action, the necessary amount of air, and is producing her own power gas. The air is entering at "c," and goes through the evaporator "b." Here it is saturated with steam and the mixture of air and steam is now going through "d" under the grate of the producer, through the fuel, and then through pipe "e," to the scrubber; from here



SECTIONAL VIEW OF A SUCTION GAS PRODUCER CONNECTED TO A GAS ENGINE.

and cheaper in construction and easy to attend, as no boiler or gas holder is required.

In a suction gas producer plant the boiler is supplanted by an evaporator which, in small plants, is built on the top of the producer, and in large plants right near the producer in the form of a tubular evaporator. This evaporator is generating the steam required by utilizing the heat of the producer and of the gases. This is of considerable advantage as compared with the old system, as the firing of a separate boiler is dispensed with, and the heat of the gases produced is used for generating the necessary amount of steam.

The heat of the gases respectively of the producer is entirely sufficient for furnishing such a quantity of steam as is required for the generation of an effective power gas. The utilization of

consists of a producer, an evaporator, an over-flow water pot, a scrubber and an equalizer (sawdust scrubber). The producer is lined with fire bricks. By the sucking action of the engine a mixture of air and steam is drawn through the burning fuel, whereby the producer gas is generated. There is always only as much gas made as is required by the engine.

The producer is provided with a hopper through which fuel can be filled into the producer without interfering with the working of the engine, and the cleaning of the grate may be performed during the regular work.

The gas leaving the producer is heating up the evaporator and causes here a formation of steam, which goes under the grate together with the necessary amount of air. From the producer the gas goes through the scrubber in which

through pipe "e," to the equalizing tank "f," which is directly connected with the engine. The gas-making process continues as long as the engine is moving, but as soon as the engine is stopped the gas-making is also stopped.

Anthracite, charcoal or coke can be used equally well for generating gas in the suction gas producer. It will take, according to the ash content, 1 to 1½ pounds of anthracite or charcoal, or 1½ to 1½ pounds of coke for developing 1 H. P. hour. With anthracite (pea) at \$5.00 per ton 1 H. P. for 24 hours will cost from 6 to 8 cents. This is about one-sixth the cost of illuminating gas power (at a price of 75 cents per 1,000 cubic feet of illuminating gas), or one-eighth the cost of gasoline (at a price of 16 cents per gallon).

The above information is from Dr. Oskar Nagel, 90 Wall st., New York

who is building plants from five to 300 horsepower. Such apparatus seems to present great possibilities in view of their cheapening of the cost of power.

Another Formula for Success.

"Well, what do you think of this?" exclaimed Fritz, looking up from THE AMERICAN BLACKSMITH that he had been glancing over. "Says here, 'Success is failure kicked to pieces.' That's a good definition, and I like it because it doesn't pretend to tell you how to succeed like all the others do."

"Yes it does," put in one of the other boys, "says plain as anything that you've got to keep a-kicking."

"Well, our friend Donnie is a kicker, without any mistake, but I never heard of his owning any gold mines or the like," retorted Fritz.

"Success and dissatisfaction go hand and hand. Do you get me?" This came from Baxter, who had been an interested listener. Punctuating his points with blows on the anvil, he continued, "To be satisfied with one's position or achievements is fatal to true success in any walk of life. The man who gets there, who does things, is the one who never stops reaching out for the next thing higher and better—the man who is never satisfied. The fellow who thinks his job plenty good enough never gets one any better. Look out for ruts, and don't forget that satisfaction kills success."

"Now, whoever heard of a blacksmith philosopher?" asked Fritz in mock amazement.

A Simple Problem in Stock Calculating.

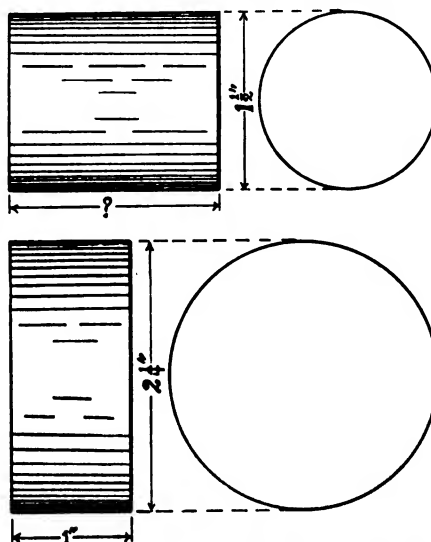
A. W. B.

A subscriber to THE AMERICAN BLACKSMITH writes that he saw the article about stock calculations on page 231 of the last September issue, and desires to ask a question about a special case. He states that oftentimes he does not have the right size of stock to make forgings of a certain diameter, and wishes to know how to find out how to figure it. For instance, he wants to know how long a piece of $1\frac{1}{2}$ -inch round stock must be cut to upset to $2\frac{1}{4}$ inches in diameter and one inch thick.

The rule for this is, multiply the diameter that your finished piece will have by its length and divide by the diameter of your stock. Or expressing it as a formula, the desired length is equal to $L \times D \div d$, where L is the length and D the diameter of your finished piece, and d the diameter of your given stock. Thus, working out his particular case, $1 \times 2\frac{1}{4} \div 1\frac{1}{2} = 1\frac{1}{3}$. In other words,

a $1\frac{1}{3}$ -inch length of a $1\frac{1}{2}$ -inch bar will upset to one inch long by $2\frac{1}{4}$ inches in diameter.

This is a special case, it will be observed, for each piece is circular in section, as the illustration shows. Suppose a more general case arises, where one piece, either the finished or the original one, is round, and the other square in section, or rectangular. We can then apply the general rule, i. e., divide the volume of your finished forging by the sectional area of your given stock, and the result is the length to cut off. This rule holds for pieces which are regular in section, like rods and bars. It is based on the fact that the



A SIMPLE PROBLEM IN STOCK CALCULATING.

volume of the piece before and after forging is for all practical purposes exactly the same.

Hints on Dressing Axes.

P. M. WATT.

Axe and hatchet dressing, to many smiths is quite a stunt, and you will find very few of the every-day smiths who can do this properly. Of course, there are always some smiths who know it all, and claim to do everything from the making of a needle to the forging of an anchor, but for doing the things properly and in the way they should be done, why they are "not there."

In dressing an axe, be careful to not overheat it and do not allow the axe to rest with its edge in the center of the fire, as it will get too hot at the edge before the heat has thoroughly penetrated the thicker part. Always place the blade in the fire in such a manner as to have the extreme edge and the thick part of blade attain the necessary heat at the same time. As in all smiths' work, practice is the only way to attain perfection in doing this.

When the blade is hot enough, ham-

mer it to as near the shape of a new axe as possible, striking on both sides and evening and trimming it to the right shape. Be careful in heating the blade, not to heat the metal surrounding the eye, and when hammering be sure you have the blade straight and true, as carelessness on this score will probably result in an axe with a blade which will cut on the bias.

When the blade is ready to harden, heat it to a low red and harden in warm water. When tempering, you will see that the temper runs out to the corners first, so it will be necessary to dip them first and continue to dip or touch them with a wet cloth when the temper wants to run out.

I might state here that the smiths who in hardening smear grease or tallow on an axe blade and then burn it off, are making a mistake and trust too much to guess work to accomplish a good job. The proper way, as all good smiths know, is to brighten the metal and watch for the temper. In doing it the latter way you know exactly when to plunge your metal into the cooling bath and when to withdraw it.

When you have brightened your axe, and it has turned blue, cool partly off until you observe a copper color. Then allow the axe to cool slowly and gradually. This simple method will make your axe both hard and tough.

The Blacksmith and the Automobile.

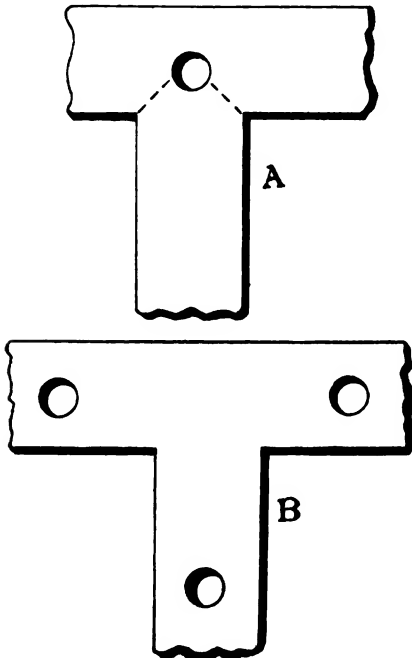
WILLIAM MURPHY.

Ages ago the first mule was invented, and the output of profanity was increased one hundred per cent. Less than a decade ago gasoline and electricity were crossed, and the result was the gas engine, which has done more to debauch the temper of man than the mule. The gas engine is the sad-eyed mule among engines. It is rough and hardy, has a voice like unto a boiler factory, and requires little sustenance, but like unto the mule it exercises its own discretion in starting and stopping. It may work a week without a murmur, and then stop without a reason. Arguments are useless; science a mockery; profanity only a relief, not a remedy. A wise man has said: "If thine enemy offend thee, buy him an automobile; then hike lest he rend thee, for thou art revenged."

The above fully expresses the feelings of an automobilist, at certain times. But with time and patience all troubles are overcome, and the blacksmith has no small share in this achievement. The great majority of automobiles are pro-

pelled by gasoline engines. In this article we will treat of the gas engine only in connection with motive power.

Today the automobile is largely confined to the use of the well-to-do; that is, the larger type of machines, or touring car; the smaller machines or runabouts are, to a large extent, used by doctors and other professional men throughout the whole country. The demand for cheaper machines, the competition among manufacturers, and the improved methods yet to be used in making the parts, will, in the near



THE WRONG AND RIGHT WAY TO MAKE CONNECTING PLATES.

future, result in the placing of much cheaper machines upon the market, which will be within the means of those who at present are unable to possess one. The increased demand will be met and supplied just as the manufacturers of buggies and carriages have met the demand for cheaper vehicles; and just as the demand for cheaper bicycles has been supplied.

Instead of using steel forgings, brass gearings and the high class material used in the majority of machines today, cheaper substitutes will be furnished. Malleable castings, babbited boxes, and other substitutes for the higher class furnishings will be used. A great reduction of prices will follow, which will shortly prove of interest and advantage to the blacksmith. But when this extra work comes the blacksmith should be fully prepared to meet all demands, outside of breakage, which will necessarily call for new parts to be ordered from the factory. The blacksmith should familiarize himself with

the gas engine and batteries, or electrical ignition, so that when the fortunate possessor of the very finest means of locomotion calls for assistance, he will be in a position to command the situation.

As a general thing, the most trouble will be found in the batteries. If the engine refuses to go, and the compression in the cylinder is good, the trouble will be found in the ignition. Carefully examine the wires to see if they are properly connected and unbroken. If wires are found all right, remove spark plug in cylinder head, turn the engine in the direction it should run, hold the spark plug against the cylinder head and see if a spark is not produced at the compression point. If spark is produced and engine will not go, examine gasoline supply. If the engine takes gasoline on suction stroke look for short circuit on battery wires.

Watch carefully the wires from the battery box to the spark plug; if wires are uncovered and come in contact with any metal part of the body, a short circuit will be formed, and the circuit is then deflected and does not reach the cylinder head or explosion box. This can be detected by the spark showing at the point of contact; and the trouble can be remedied by covering wire or screw heads with adhesive tape.

The vibrator connected with spark coil, or battery box, should, by turning engine ahead, or in the direction it should run, give out a distinct buzzing sound on the full compression stroke. This can be properly adjusted by experiment, and is very important in the proper repairing of automobile engines. When compression in cylinder is poor or entirely absent, look for the trouble in the inlet or exhaust valves. A sticky valve stem or a speck on a valve will cause a loss of compression, and stoppage of the engine and it will not run until the cause is removed.

Gears are sometimes broken, keys sheared off, and these have to be removed and replaced, necessitating careful work, and intelligent application to the problem at hand. This work depends altogether on the make of the machine, and necessarily the judgment of the repair man. Don't be in a hurry to take a machine apart; examine it carefully, locate the trouble, intelligently consider the remedy, and then go ahead.

In this work practical experience will, as always, prove a very reliable teacher. This experience is to be gained in no other way than by prac-

tice in the actual problems presented. With experience, come confidence and the pleasure of doing and curing troubles, which come to the mechanic in the performance of his varied duties.

Connecting Plates for Shafts and Poles.

HIRSH STRIFF.

When we make a pair of shafts for a vehicle, we frame the bar into the shafts at a certain point, by forming a tenon on the bar and a mortise on the shaft. In doing this we necessarily remove some of the wood and weaken it at the points where it should be the strongest. To make up for this weakening we strengthen the joints with plates.

The sketch A shows a "T" plate, such as most wagon workers make. Because their fathers place a bolt hole as shown, they must necessarily do the same and as this weakens the plate considerably, the first hard strain will part the plate and joint as shown by the dotted lines.

The sketch B shows how to overcome this weakening of the joint, and when the bolts are placed as shown by the holes, the joint will be as solid and strong as it can possibly be made.

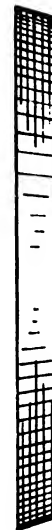
A Wheel Repairing Kink.

J. W. KINSLAY.

I have seen many things of interest in your valuable paper and read them with pleasure. I have used a kink for some years that I have not seen many use.

When a wheel is dished the wrong way and you remove the tire, make saw cut in felloe, screw down the wheel, reset tire and then the wheel goes back again, and the felloe worms out from under the tire, you will notice upon examination that the tire is hooping with the larger side on the outside. The illustration shows the hooping much exaggerated. Now to overcome this trouble, give the tire the usual draft, if necessary put a piece of leather in saw cut and turn tire bottom side up or face side toward back and put on wheel; drill new holes for bolts or bore new ones in the felloe, rebolt and your job is finished.

Some times the tire will draw the wheel back all right without any screwing down to help it. I have found this a success on bad wheels, and the wheelwright will do well to bear the above in mind when next repairing a wheel that is very badly dished.



Better to Climb and Fall.

ANONYMOUS.

Give me a man with an aim,
Whatever that aim may be,
Whether it's wealth, or whether it's fame,
It matters not to me.
Let him walk in the path of right,
And keep his aim in sight,
And work and pray in faith away,
With his eye on the glittering height.

Give me a man who says,—
"I will do something well,
And make the fleeting days
A story of labor tell."
Though the aim he has be small,
It is better than none at all;
With something to do the whole year
through
He will not stumble or fall.

But Satan weaves a snare
For the feet of those who stray;
With never a thought or care
Where the path may lead away.
The man who has no aim,
Not only leaves no name
When this life is done, but ten to one,
He leaves a record of shame.

Give me a man whose heart
Is filled with ambition's fire;
Who sets his mark in the start,
And keeps moving it higher and higher.
Better to die in the strife,
The hands with labor rife,
Than to glide with the stream in an idle
dream,
And lead a purposeless life.

Better to strive and climb,
And never reach the goal,
Than to drift along with time,
An aimless, worthless soul.
Ay, better to climb and fall,
Or sow, though the yield be small,
Than to throw away day after day,
And never strive at all.



Short days. How about the shop light?

Bad accounts may be handled in many ways. What's your method and how does it work?

Sharpening time won't be long in coming, and, of course, your shop will be prepared to take care of all rushes.

Our experimental shop—a new idea. It is run for the benefit of AMERICAN BLACKSMITH readers, not for profit.

Brief notes about shop hints are appropriate for the new column, "Our Experimental Shop." Send them along.

What are you doing to extend the good work of THE AMERICAN BLACKSMITH? Sent in that new subscriber yet?

"The passing of the horse," said the automobilist, as his machine refused to go and the farmer's old horse slowly plodded on past him.

There is one smith that we have waited these three years to have send in a single

item for this paper, his paper. Are you the fellow?

First impressions are lasting. How does the outside of your shop impress new or possible customers? A little paint is often a good investment.

Don't blame us if your order for fifty calendars comes after they are all gone. The supply is limited and the demand great. Better order today.

A good opening for a blacksmith exists at the present time in Atwater, California. For further particulars, address Mr. J. B. Osbone of that place.

When buying new tools investigate the good points of all. Write to many firms and determine for yourself which make is best suited for your particular needs.

Cultivate cheerfulness and good nature. Couple them with advertising and you have the best of trade winners. Combine them with good work and you have the best of trade holders.

It is interesting to know that there are sounds which the human ear cannot hear, either because their pitch is too high or too low, just as there are light rays which our eyes cannot detect.

Success is won in one way only; by hard work. No such sign as "ease" appears on the road to success. No short cuts are seen, for it is one long, up-hill, stone-strewed, bramble-covered road.

A dog helper is the unique adjunct of one Western smith shop. Whenever his master puts the iron in the fire, this blacksmith dog starts in to work the bellows by means of a crank and wheel arrangement.

Wake up. It's time you were getting better prices for your work. You never will if you try to fight it out alone. Organization is the solution of the problem. You can start such a movement with profit.

Forty smiths have contributed ideas in this month's paper, many of them of direct value to you. How long will it be before you contribute something through these columns for the benefit of the craft?

Our motto is, blacksmiths at the first table—nothing too good for them. We preach better pay for the smith's labor, with lien laws to protect it, and we lose no opportunity to help the good work along.

Are you in line for a lien law in your State to enable you to collect bills more promptly and surely? Are you willing to aid us in getting one? No expense involved. Write us at once, as the time is flying fast.

Catalogues, every one almost, are worth retaining for the information they contain. The up-to-date smith has a special file for them so he can place his hand on any desired one at a moment's notice. But many smiths, like Tom Tardy, never save their catalogues.

The wise smith looks ahead. Several craftsmen of this type that we know of have acquainted themselves with automobile repairing. And, by the way, 'twas these same men who were first in their respective localities to equip their shops for rubber tire work.

Acetylene gas as a shop illuminant is excelled in brilliancy. Some smiths light their shops and houses with it. We know of one blacksmith in particular who as a

side line, contracts to install it. He has made several nice margins and the plants give satisfaction.

You owe something to THE AMERICAN BLACKSMITH besides paying your dollar a year, and you also owe it to the blacksmith fraternity, to send in an article occasionally on some shop topics of interest. Tell your brother craftsmen about that special job you did the other day, or that handy kink you discovered. Write it out. Send it in.

The advertising columns of this journal are open to all readers. Any one of them can buy space just as cheaply as the largest manufacturer. If you have any tool to advertise, consult us for rates. We can place your advertisement before 25,000 blacksmiths and wagon makers each month, 50,000 in January. Our "Wanted" and "For Sale" column is very popular.

Doomed are the bellows. How often do you see them in the best equipped shop; how often do you see them advertised? And is it any wonder, considering how bulky, cumbersome and perishable are the old bellows, compared with the modern compact and durable blower? It is the old story of efficient, modern machinery replacing the laborious devices of antiquity.

January 1, 1905 is the date. Before that time we want every one of our present readers to get a brother blacksmith to take the paper. This will enable us to make the journal still better, and to extend its usefulness. Then too we reward you with six months' credit on your own subscription for the name and dollar of each new reader you send us before that time. Don't forget the date.

We have discovered a good trait in the business methods of our esteemed friend, Thomas Tardy. Tom pays spot cash for all the goods he buys from his jobber. But the jobber tells us there's a reason for this refreshing punctuality on the part of our usually slow moving smith. Tom's credit is no good. If he hasn't the cash, he doesn't get the goods,—often this means the loss of a job.

Christmas money—would the boy like to have some in his pocket? We have a way to help boys to earn a respectable sum of pocket money Saturdays and after school hours. It's easy work, pleasant work. Tell the boy to write to THE AMERICAN BLACKSMITH, Buffalo, N. Y., for full particulars, and we will tell him just how to do it. We want one bright, energetic boy in each city and town throughout the land to take advantage of this opportunity for earning some ready cash. It costs them nothing to make a try. Tell the boy to write—today.

Four cents. Surely you have fifty customers who are worth spending four cents each upon in order to advertise your shop for a year. Give them each a handsome calendar with your name upon it this New Year's. Such calendars mailed to parties whose trade you want, make splendid ads for getting new business. But if you are thinking about getting fifty of our 1905 souvenir calendars, with nothing but your own advertising matter printed on them, you had best order before the sun sets again, or you may be too late. See announcement on page xxxi, this issue.

American Association of Blacksmiths and Horseshoers.

The Movement for Better Prices.

It is with pleasure that we can report substantial progress in many localities towards the formation of strong local associations, and the raising of prices to proper figures. Once more we desire to urge that steps be taken at once before the roads get bad, to raise prices in every community where they are low. And where are they not so?

Address us at once at Drawer 974, Buffalo, N. Y., and plans for forming local county associations will be promptly forwarded. It will cost you nothing to make the effort. There is everything to gain. A small raise in prices all around at this time may mean the difference between need and comfort to those at home. Will you make the effort now?

We have invariably found that even when a movement of this kind does not result in an immediate raise in prices, great benefit results to all concerned. Hence we repeat, you have everything to gain. One case in point will illustrate this, taken from a county in Kansas. The secretary of the association, Mr. L. L. Ruhlen, writes us as follows:

"We held two meetings. At the first about two-thirds of the shops in the county were represented. Committees were appointed to recommend a schedule of prices, to draft by-laws and to report at our next meeting. On that date the weather was bad, it having rained all the preceding night and afternoon, but there were fourteen smiths present. Most of those present were in favor of letting the matter rest until later in the season, and we will try to take the matter up again early this winter and complete a permanent organization.

"As to the benefits derived so far, I think that even if nothing else should be done the smiths of this county have been benefitted a great deal. We have become acquainted with each other, got closer together and are working more in harmony than ever before. We have made good progress toward a lien law in the coming session of the State Legislature. We have corresponded with a good number of the blacksmiths of the State, and have their promise to use their influence with their county representatives to get them to support the measure if it comes up before the House.

"I am sorry that (at our first attempt) we failed to succeed in getting a permanent organization. We expect to keep trying and to succeed. A good many of the smiths are now receiving

THE AMERICAN BLACKSMITH, and I think that the articles appearing in it from time to time will get them better acquainted with organization, and it will be much easier to get them in line at our next attempt.

"I give the American Association of Blacksmiths and Horseshoers, of Buffalo, credit for the good that has already been accomplished, and will ever have a high regard for that organization."

State Lien Laws for Blacksmith Labor Protection.

Are you interested in the matter of obtaining a lien law in your State so as to be able to collect your pay more promptly and surely? Many States, by their labor laws, permit work to be held in the shop if desired in order to secure payment, but such a law is of little value in practice to the smith. What is greatly needed is legislation to empower liens on horses or vehicles after they have passed out of the possession of the mechanics who expended labor or material upon them. The blacksmith certainly works hard enough to more than justify every single bill he sends out, and hence we claim he should be given the benefit of every possible bit of legislation to aid him in collecting his pay. Just and greatly needed though such lien laws are, it is morally certain that they will not find a place upon the statute books until the craftsmen themselves make a determined stand for them. Sessions of the legislature in most States will convene now within a couple of months. All those who feel the need of lien law legislation, and who are willing to do their part toward securing it, are urgently requested to send their names to the American Association of Blacksmiths and Horseshoers, Buffalo, N. Y. Your influence and aid are needed. No expense involved. Will you write?

Oil Burners and Furnaces.*

In the last eighteen months all of the coal heating furnaces in the rolling mill, as well as the larger reverberatory furnaces utilized for all kinds of large forgings, such as used for locomotive and marine forgings, also our bolt and nut factory, as well as forging machine furnaces, have been converted into oil burning furnaces.

The main question to be considered in comparing coal with oil for use in reverberatory furnaces is economy. This is governed by the price of fuel oil compared with coal, as well as many other conditions that present themselves regarding economy.

*Report by Mr. S. Uren, read before the N. R. M. B. A. Convention, at Indianapolis.

The first question to be considered is the number of gallons of crude oil required to bring one ton of scrap iron, put up in piles varying from 200 to 1,000 pounds, to a welding heat. For a rolling mill in the Sacramento shops it requires 40 gallons of crude oil, as it comes from the well, 14-gravity, to heat 2,000 lbs. of scrap material or pile. In our old coal reverberatory furnaces, it required 500 lbs. of bituminous coal to heat the same quantity of metal. Furnace coal in this locality costs from \$5.00 to \$6.00 per ton, oil costing one cent per gallon; consequently the oil costs us 40 cents to heat one ton of metal while with our old coal furnaces it costs us \$1.25 to bring the same metal to the required heat, making 68% which is saved in the cost of fuel alone.

The next thing to be considered is the handling of the two fuels. It requires six men to bring the coal to the reverberatory furnaces and bolt factory, from the coal pile. This alone costs the small item of \$12.00 per day. Our oil tanks are so arranged that one man distributes oil over the whole works.

Another thing to be considered is the hauling away of the ashes and cinders that are produced daily. It requires a horse and cart daily to remove this waste to the dumps.

Another important consideration is the fireman. He has to handle between five and six thousand pounds of coal daily, clean his grate bars at noon and night, shovel out the ashes and cinders, and oftentimes knock out the brick work in the fire chamber, trying to knock off the clinkers. All this hard labor is reduced 75% by the use of oil.

The output of the furnaces heated with oil is at least 20% more than with the old fashion coal furnace. One reason for this is that there is no time lost in cleaning grate bars and wheeling out ashes. This requires at least an hour and a half a day, and sometimes when inferior quality of coal is used, and much ashes and cinders accumulate in the coal chamber, there is a delay of two hours a day, almost exhausting the fireman to keep the grate bars clear to receive the oxygen sufficient to produce proper combustion.

The most important question relative to the two fuels is the quality of the iron produced from the scrap material. I have come to the conclusion that hammered iron for railroad appliances, (such as locomotive forgings or for any other purpose where the metal is subject to compressive, tensile and vibrating and torsional strains), produced from oil fuel,

is far superior to meet those conditions than similar metal produced in the old style furnaces. My experience in manipulating the scrap material heated with oil finds less defect in working by lamination than with iron brought to a welding heat with coal.

At our last convention my friend, Mr. McNeal, remarked that he had far better car axles, more free from seamy journals, when the same were produced by the metal being heated with oil than with coal. I certainly coincide with Mr. McNeal in this regard. My experience is that we have had 50% less car axles condemned on account of seamy journals since we have adopted fuel oil for heating. This not only occurs with axles, but all other forgings. Similar conditions exist in the Sacramento rolling mill, in rolling complicated sections from scrap material, such as angle iron, channel beams, etc.

Our defective bars have been reduced 50% since the introduction of oil for heating purposes.

It will be observed from the foregoing statement that our company is saving 70% on fuel alone. Even if the two fuels cost the same to produce the same tonnage, the improvement in the production and the benefit to the employee would be incalculable.

I claim we get a much softer heat through the body of the metal, making it much easier manipulated; in other words, the metal absorbs the heat produced from oil better than with coal. I cannot give any good reason for this, but I know it to be so from experience. We all know that coal used for furnace purposes in many cases contains much sulphur and other elements or gases that have an affinity to iron, and when the heated scrap piles become too near a molten state, they absorb the impurities contained in the fuel, causing what is termed red short or cold short iron.

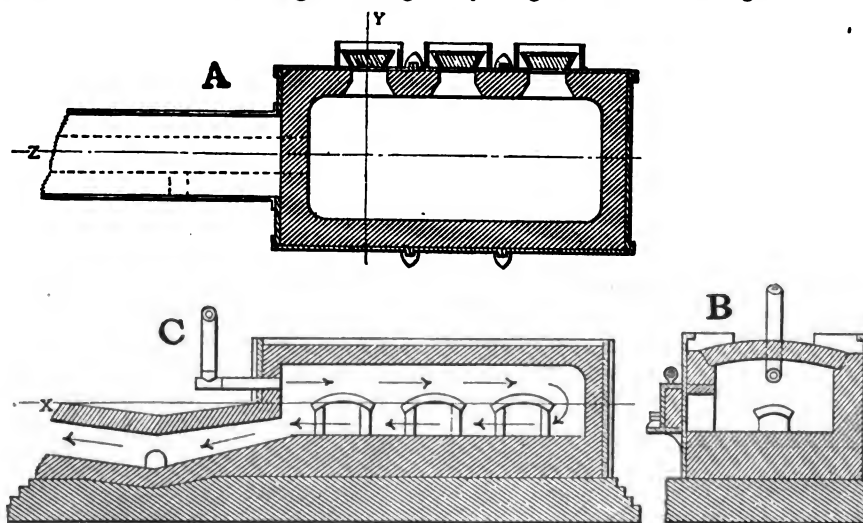
Another thing to be considered is the cost of the brick lining of the furnaces, in keeping them repaired.

It is evident from the foregoing statement that there is more intense heat in the heating chamber with oil than with coal, as the iron is heated much faster. The same conditions exist with the fire

brick; the roof door jambs, and the side walls cut away much faster with oil than when coal is used.

We must take into consideration the destruction of fire brick in the old-fashioned furnace fire-box and bridge wall. This portion of a coal furnace is the most destructive on fire brick. Much of the destruction of the brick is caused by removing the clinkers that adhere to the brick work with such tenacity that it is almost impossible to remove the same without destroying the brick.

The bridge wall is another source of wasting fire brick. In the Southern Pacific shops it requires quite a force of brick masons and helpers on Sundays to repair the fire box and bridge wall, to put the furnaces in shape for Monday morning. Taking everything into con-



SECTIONAL VIEWS OF FURNACE, USING OIL AS FUEL.

sideration the brick required to keep up the furnaces for the two classes of fuel is about equal according to the output.

From my point of view, oil at six cents per gallon and coal at \$5.00 per ton about balances, as far as the cost of the two fuels is concerned, but the improvement in the quality of iron produced by heating with oil instead of coal is incalculable.

Another important factor in the expense of operating is the power required to atomize the oil, and furnish sufficient oxygen to produce perfect combustion. Compressed air I find to be an expensive commodity. Steam is also expensive, and from my experience is not as good as compressed air for the purpose. My experience with the old fan blast, so well known in all forge shops, is, that it is the cheapest and best when properly applied. From eight to ten ounces' pressure is all that is required for atomizing and perfect combustion.

The success of oil burning is in the

shape of the interior of the furnace.

We are all familiar with the coal burning furnaces that are known as reverberatory furnaces, which have the fire box for the reception of coal with the blast passing up through the grate bars, the heated gases and smoke passing over the bridge wall coming in contact with the metal.

In many cases the old method of providing a combustion chamber about four or five feet from the bridge wall introducing the oil at the same end of the furnace and the heated gases passing over the bridge wall and coming in contact with the metal, the waste gases passing through the flue. The oil is forced into the furnace with compressed air or steam; this high pressure passing through the combustion chamber forms

a suction. Openings are left in the lower portion at the end of the furnace, permitting the air to flow in.

Another method is to carry the rear wall four or five feet back of the original bridge wall, and up several courses of perforated brick work a little above the opening made in the lower portion of the end of the furnace, for the purpose of heating the air that is drawn in, to

form more perfect combustion.

When we first commenced to change our furnaces, I followed the plans of my old friend, Mr. T. R. McNeal. I built two of his furnaces for making axles. This furnace has been described at our convention by Mr. McNeal.

The furnaces worked well, but it was necessary to use the expensive commodity, compressed air or steam. However, we had 13 furnaces to change, and did not have the appliances to furnish the compressed air, but had plenty of blast from our fans, from eight to ten ounces' pressure.

After examining all small bolt furnaces, and putting the different methods together, I concluded to try a different shop reverberatory furnace from any now in use.

As an experiment I built the bridge wall up to and joining the roof, cutting out the old coal fireplace, building the roof straight near to the flue. Then I built a perpendicular wall down to the

flue, introducing the burner about seven inches from the roof, as shown in the accompanying drawing, page 32, C.

in demand in a blacksmith shop.

A, in the accompanying drawing, shows a horizontal section of my furnace through X. B is a vertical transverse section taken through Y.

C is a longitudinal section taken through Z. It will be observed by the drawing that the burner passes through an aperture in the brick wall directly over the flue, blowing the oil in over the metal.

The furnace is three feet between the hearth and furnace roof, this height giving plenty of room for perfect combustion by the time it reaches the opposite wall. A perfect incandescent flame then returns by the draft of the flue as shown by the arrow points, and when mixed with the metal to be heated, the waste gases can be diverted under the boiler for producing steam, or through a stack, as desired. Much care should be taken in

to such an extent that it will not flow in the direction required. The reason I mention this is that I had an unfortunate experience in this regard with my three-door rolling mill furnace. Through some accident the burner lowered on the outer end causing the oil to strike the roof. A lump of carbon was removed and the burner placed in the right position; we had no more trouble at all.

The furnace shown in the drawing is a three-door rolling mill furnace. All our forging furnaces have two doors only, operated by the same method as the three-door furnace.

From my point of view this is the most simple and economical furnace now in use, as it is a perfect reverberatory furnace. Perfect combustion is produced and not a shadow of smoke can be seen from the stacks, when properly manipulated.

The Use of Thermit for Welding.

Considerable has been appearing in the mechanical press regarding the use of the new compound, Thermit, for various purposes, such as welding rail joints, wrought iron and steel pipes and broken machine parts, especially of large size, as also its application to foundry practice. The following therefore may be of some interest to AMERICAN BLACKSMITH readers.

Thermit, a metallic powder recently discovered by Dr. Hans Goldschmidt, consists principally of aluminum combined with oxide of iron. By suitable chemical combination of the two elements aluminum and oxygen, which occur in great frequency in many forms



STERNPOST OF HAMBURG-AMERICAN LINER "SEVILLA," SHOWING WELD MADE BY THERMIT PROCESS.

I lit the furnace, using compressed air. In one hour after being lit the heat was so intense that the slag commenced to pour through the slag hole. We then tried steam instead of air with good results in heating the iron. We still use the fan blast to furnish oxygen for combustion. Finally the fan blast was used exclusively for combustion, as well as for atomizing. I find this method gives the best results. This furnace can be operated with compressed air, steam or the ordinary fan blast; however, I find the fan blast preferable. The same burner will answer perfectly well in either case.

It will be observed by the accompanying drawing that the furnace referred to is about four feet shorter than the furnaces usually used for burning oil, and still having the same heating space on the hearth as other furnaces. This in itself is sufficient reason for adopting the furnace, as floor space is always

placing the burner direct in line and about seven or eight inches below the roof so that perfect combustion will take place before the oil comes in contact with the iron on the hearth or the heated walls of the interior of the



OUTFIT AND METHOD USED IN WELDING RAILS WITH THERMIT. TIME REQUIRED FOR EACH WELD, FROM THE PREPARATION OF JOINT TO COMPLETION OF OPERATION, TEN MINUTES.

furnace. Should the oil come in contact with the roof or side walls, lumps of carbon will form, diverting the flame

on the earth, a high temperature may be produced, about equal to that of the electric arc. Advantage of this property

is taken by the compound thermit, and the heat of the chemical reaction has been utilized in various manners as above stated, though the application concerning us chiefly, is that of welding.

Thermit, consisting as it does of aluminum and oxide of iron, produces after combustion a molten mass of liquid iron at a temperature of 5400 degrees F., and this thermit steel of exceedingly high temperature has the property of melting cold surfaces of metals which it touches, and uniting with it to form a solid mass. It is this property which is utilized for welding iron to iron, very much as in the process of soldering lead to lead. The process may be applied to girders, bars, angles or in fact to any broken iron parts. The surfaces of the metals to be operated upon must be free from rust and grease, and great care taken that no moisture is present, because of the steam which would be generated by the high heat of the liquid iron.

In the practical application of this process the parts to be welded are

bottom of the crucible, and is covered with a layer of slag. In the bottom of the crucible is a pin closing the outlet and when the reaction is completed, the crucible is emptied into the mold by giving this pin a sharp knock upwards. The welding is thus effected by the molten steel which melts the two adjacent ends exposed in the mold and amalgamates itself with the metal into one solid mass without any visible joint.

This process seems to have a wide application of uses, its principal one thus far being the welding of the ends of electric road rails into a continuous metallic line. The process has also been used for welding broken locomotive frames under engines with considerable success, thus obviating the necessity of dismantling the engine. The welding of wrought iron pipes may also be readily obtained by the use of thermit, the process being slightly different. In this case the molten metal does not come in actual contact with the pipe, the heat of it being utilized

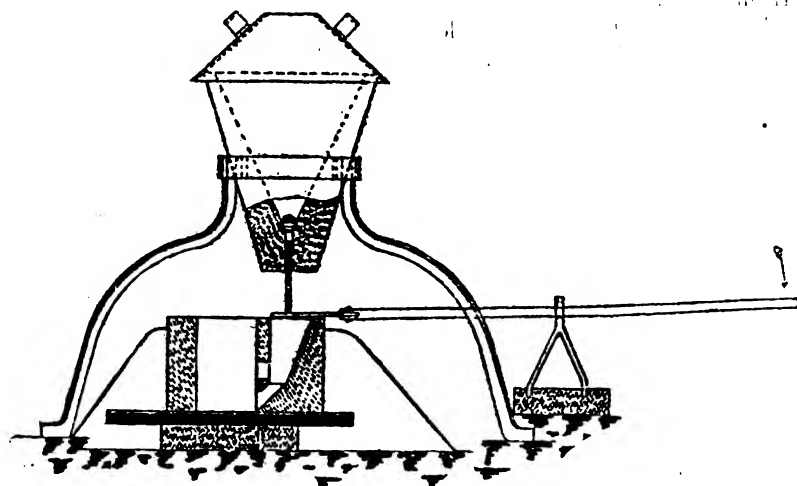
or on horseback, when a story-and-a-half country smithy came into view, and as I drew nearer I noticed the following legend over the door:



My first impulse was to poke a little fun, and no doubt I would have fired a broadside had I not seen a good-looking platform coupe rockaway in front of the door, from which the hind axle had been removed—perhaps for repair. I gaged myself accordingly, made for the door, and got there in time to see the smith and his helper remove an axle, in two parts, from the fire, place the same upon the anvil, overlap the two broken ends and then begin a great hammering. My! How the metal did spit and sputter, but no weld. "Donnerblitz! How is de madder mid him, Jakey? You didn't holt him right alretty." "Shoor I did poss, aber, I kess de hits don't vas right alretty." After this brief dialogue the boss suggested, "Vell, Jakey, me dry it again, ain't it." And they did, and out she came sputtering worse than ever—another lapping and hammering, but no weld. "By chiminattie, wat you dink about it, Yakob?" "I coodn't told you, poss; you hot to know all about him I dink."

The owner of the vehicle stood by apparently in despair. The "poss" raised courage enough to remark, "I told you someding, misder, dot oxel is vorhexed (meaning bewitched). I kan mit him noding make yet alretty." The owner's jaw fell. Five miles from town, his wife and family with him. I saw he was about to give up the ghost, when I came to his relief with, "Well, gentlemen, with your help and permission I will weld that axle and have it under the carriage in one hour." "Py chiminatti is dat so, a shintlemans mit fine close weld me a vorhexed oxel?" said the boss.

I had noticed some clam shells in the garden as ornaments. The boss informed me he had no borax—"Welding kombounds, vat is dose?" By this time Jakey came in with a couple of the clam shells in compliance with my request and while I was getting ready for business, I had him busy pulverizing them. While he was thus engaged, in rushed the "boss' frau," "Yakob! du



SECTIONAL VIEW OF THERMIT WELDING OUTFIT, SHOWING THE TAPPING APPARATUS. THE LONG ARM IS GIVEN A SHARP KNOCK, AS INDICATED BY THE ARROW, AND THE LIQUID STEEL RUNS DIRECTLY INTO THE MOULD.

brought together and firmly held in position and a mold of well-dried, sharp sand and common clay, equal parts, built around the joint in such a way that the liquid iron will run in between and around the ends of the parts in the shape of a ring. Above the mold is placed an especially prepared crucible of refractory material, and into this is placed enough of the thermit powder to make the weld. On top of the powder is placed a pinch of ignition powder, and when all is ready, this is touched off with a bunch of common matches. In this way the chemical reaction is started and is completed in a half minute, the result being a molten mass of pure liquid steel, which sinks to the

bottom of the crucible, and is covered with a layer of slag. In the bottom of the crucible is a pin closing the outlet and when the reaction is completed, the crucible is emptied into the mold by giving this pin a sharp knock upwards. The welding is thus effected by the molten steel which melts the two adjacent ends exposed in the mold and amalgamates itself with the metal into one solid mass without any visible joint.

The process promises considerable in the way of rapid and effective welding and should be of special value in repairing breaks or making welds where it is impossible or costly to take the parts to pieces.

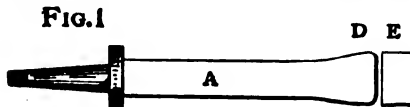
A True Story of Axle Mending Under Difficulties.

T. U. BALCAN.

It is unnecessary to state in just what part of Uncle Sam's domain it was, but it happened somewhere, which ever way you may put it. I was coursing along the road, it matters not whether on foot

dumm kppf, vat you make mit mine clam shells?" The boss opened fire with "Katerina, shust you go de house in. I is de poss here out, py chiminatti, alretty." When Katerina saw the audience waiting for the circus, she departed with, "Well, Yakob he git some supper tonight, not. I fix him yet."

To make the story short, I got the length necessary for the axle between collars and then upset the "botched" ends until I had them the size I wanted. The axle was of mild steel, but still hard enough to require a little coaxing. I found there was over an inch missing and that it would require nearly one and one half inches to fill up the gap. I hunted around and found a piece of iron, E, Fig. 1, which I made to suit. I punched a hole through this, endwise. A is the stock of axle upset at D. At the end D I put in the punch a little ways, and with a cold steel spike fastened E to the axle at D. I then fixed up a nice coke fire, put in the axle end and used my pulverized clam shells as a flux. When my heat was ripe enough I removed the axle from the fire and butted it against the anvil until I had a solid jump weld and before the heat had fittted I hammered down the bulge caused by jumping. I previously

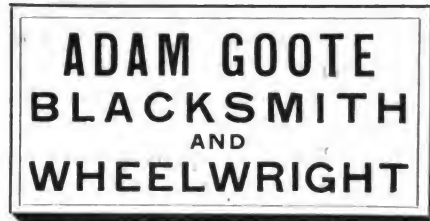


METHOD OF WELDING AN AXLE.

found two old light hubs. Fortunately, the bands were still on and the hole just fitted the arms and butted up against the collars nicely. I then placed the two broken ends of the axle in the fire as in Fig. 2. The boss then placed one hub on the arm at his end and "Yakob" stood by with a sledge to hold it. The owner of the carriage raised the wind and I watched the fire and applied my clam shell flux. When ready, the boss held his end of the axle and the hub which was backed up by "Yakob" and the sledge, and your humble servant with hammer and hub did good service, jumping the two centers together, and at a signal, the boss with myself put the axle on the anvil. "Yakob" was there with his sledge and together we got the bulge down to normal shape. While yet hot we got the axle in proper set, and then laid it on the earth floor until cool. Then we rasped the weld, ap-

plied a coat of black, and put the axle on the carriage.

Well I had to stay over night at the expense of the house. When I went away I had an order for a subscription to THE AMERICAN BLACKSMITH, in which the "poss" and "Yacob" were to read all about "welding kombounds." You would not know the place now because the new sign over the door now reads:



How to Lace a Belt.

F. H. B.

Many AMERICAN BLACKSMITH readers have installed power in their shops and therefore a few hints on belts and belting will not come amiss at this time.

In placing shafts which are to be connected by belts, care must be taken to have them the right distance apart, as two pulleys too close together will allow no sag in the belt, which must therefore be very tight to do any work. A distance of from 10 to 15 feet is about right for small belts, but wider belts will want more distance.

Now in fastening belts, the best method is to lace them, proceeding as follows: Punch holes in your belting according to its width; don't punch too close together or too near the edge of the belt. After punching the holes, proceed to lace, beginning at the center and lacing toward the sides in such a way as to have the lacing cross on the outside of the belt and not on the side next to the pulleys. When the belt is laced, punch a hole, just large enough to receive the lacing, a little farther up on the belt and bring the end of the lacing through this from the inside of the belt. Now cut a notch in the lacing, close up to the belt, having the open end of the notch toward the belt and cut the lacing off about half an inch from this notch. Your lacing will be found to hold securely and the end is not likely to pull out.

Diseases of the Foot—Causes, Symptoms and Treatment—3.

W. O. JULIUS.

The Frog.

The frog is so important a part of the foot, and is so often misused by the shoer that a special talk on it will perhaps be of benefit.

The frog is that part of the foot situated between the bars, is "V" shaped,

and is soft and elastic to the touch. Its purpose is to act as a cushion in destroying concussion and to prevent violent shock and slipping.

As the frog is always exposed, except when protected by a bar or pad, it is very liable to bruises and cuts from stepping on stones or other hard objects, and when injured in this manner the injury is usually followed by a pus formation under the horn and gangrene in some instances. A cut or puncture inflicted with a blunt pointed instrument may cause the same trouble.

In treating this trouble apply poultices and cut all the detached portions of horn away, and if the frog is detached from the plantar cushion, as it is in some cases, it should be removed with the knife. When the dead flesh and diseased tissue have become detached the wound should be treated with stimulating dressings of turpentine and oakum. Following this treatment, a new horn will be forming, and when sufficient to hold a shoe, the foot should be shod with a light shoe, after filling the hoof well with oakum and covering with a leather pad. The animal may now be put to light work, care being taken so as not to work too long or steadily.

In fitting a shoe to the foot and when paring, be careful, so as not to injure the frog; don't touch the frog at all with the hot shoe and only in rare cases with the knife. If the frog is somewhat scaly, the scales may be cut or pared with the hoof knife, but the shoer must exercise care in doing this.

Thrush.

This affection is caused most commonly by unclean stables, although changing from very dry to very moist districts and hard work on rough roads may induce the disease. It is usually detected by the excessive moisture in the cleft of the frog, and the offensive smell and, in advanced cases, by a thin watery discharge which changes to a thicker pus like matter and gradually destroys the frog.

The treatment of thrush consists of first removing the cause of the disease by keeping the stable as clean and free from filth as possible, and paring the diseased parts of the foot and poulticing for a couple of days with boiled turnips to which has been added a handful of powdered charcoal to destroy the offensive odor. The cleft of the frog should be filled with dry calomel and the foot dressed with oakum and a roller bandage, which may be left on for two or three days at a time if the

discharge is not profuse. When the horse is to be shod, shoes with high calks will aid in keeping the frog out of the dirt and mud, but shoes with ordinary calks should be restored when the diseased portions are entirely healed and a cure is effected.

Punctured Wounds.

Punctured wounds are more common in the foot of the horse than any other injury and are most serious when they involve the more important organs contained in the foot. Nails, glass, wire, sharp pieces of rock and knives are all

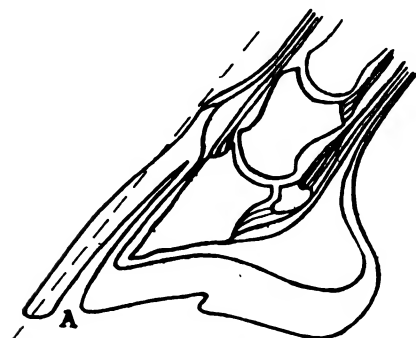


Fig. 1.—A SEEDY TOE. THE BULGED CONDITION OF THE OUTER WALL RESULTS FROM THE PRESSURE OF FOREIGN MATTER IN THE CAVITY. A. THE DOTTED LINE, INDICATES THE NORMAL PROFILE OF THE WALL.

means by which an injury may be inflicted. When the instrument by which the wound is inflicted is blunt-pointed the injury is generally more serious than if caused by a sharp point, and the nearer the injury approaches to the center of the foot the more likely are serious results to follow.

Wounds of the foot can generally be detected by lameness, although, at times, the lameness will not develop until the wound has shown indications of a pus formation. The lameness, where accompanied by suppuration, is usually severe, the animal refusing to use the injured foot at all.

In treating all punctured wounds of the foot, the horn around the wound should be thinned down and an opening made for the escape of the pus; the foot should then be poulticed to draw out all inflammation and heat. This will usually suffice when the injury is not in the deeper tissues, but when the bone is injured a cold foot bath, into which two ounces each of sulphate of copper and sulphate of iron have been dropped, should be used until the dead bone is sufficiently softened, when it should be removed and the wound dressed with a solution of carbolic acid, oakum balls and a roller bandage.

In some cases of wounds of the foot, the suppuration soon ceases and the joint will become stiff. No treatment

will relieve this and the animal must either be put to light work or kept for breeding purposes only.

(To be continued.)

Three Remarkable Cases of Seedy Toe.

E. W. PERRIN.

During the last year, three remarkable cases of seedy toe came under my notice; all of them were young mules, straight from the farm. In each case there was nothing that would indicate to the casual observer that there was anything the matter with the feet, and were it not for the presence of lameness, suggesting a close examination, the disease would not have been discovered, for the shoe hid the defect. But on a close inspection of the profile of both front feet, I noticed a marked prominence in the affected foot (see Fig. 1), and on tapping the affected hoof with a hammer, the seedy toe emitted a hollow sound over the cavity, and on removal of the shoe, I found a cavity between the inner layer of soft horn and the outer wall, in which you could completely hide a No. 10 horse nail.

Causes.

I was not able to learn anything of the history of these cases, for the owners had purchased these mules, thinking them to be sound. But I have seen many other cases of seedy toe in various stages of development. It is common here for farmers to have their stock shod while they haul produce to town during fall and winter, and then to let them go bare-footed for the remainder of the year. When the stock comes in for the first shoeing in the fall, it is common to find a mule whose feet were perfect when last shod, with a cavity in the wall (generally at the toe), from $\frac{1}{4}$ to 3 inches deep, and usually the cavity is jammed full of small rock or clay. When once a small rock becomes imbedded in the wall, if not removed, it works upward, separating the wall from the inner layer of soft horn, thus making the cavity, which is called seedy toe.

Treatment.

Whenever the cavity is of considerable depth, the only safe method of treatment is to cut off every particle of separated horn. I have treated a number of cases said to be incurable, and cured every one of them by this method. To take the bearing off the wall is not

sufficient, because the cavity fills up with earth which acts as a wedge, separating the wall as fast as it grows down. Take a pair of sharp nippers and cut away every particle of separate wall, then use a knife, cutting back the wall until every crevice is exposed to the light. If the cavity extends to the coronary cushion and pus has formed (in which case there will be acute lameness), cut away the horn as close to the coronary cushion as possible without causing it to bleed, then poultice the wound until all the lameness has subsided. Then shoe with a bar shoe, nailed right back to the heels, and weld a thin plate to the toe of the shoe (see Fig. 2), so as to protect the exposed, soft horn from injury. The foot should be closely watched at each shoeing, and any separated wall should be continually cut back until it grows down solid. If the growth be tardy, use a mild blister to the coronet twice a month. It may take from four to twelve months (according to the extent of the fissure), to affect a cure, but when the new horn grows down to the ground surface solid, as it will if these instructions are faithfully carried out, you will have a permanent cure.

Shoeing to Cure Interfering.

F. T. BROWN.

I would like to say a few words on interfering. Perhaps it will help some

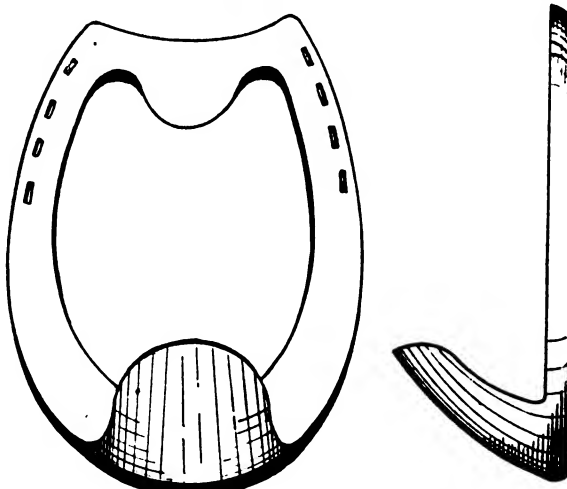


Fig. 2.—A BAR-SHOE WITH A TOE-PLATE TO PROTECT THE SOFT HORN.

brother. If so, I shall feel amply repaid. I divide, in my mind, all horses which come to me that interfere into three classes: those that toe in, those which stand straight, and those that toe out (base narrow, in line and base wide). I shoe different for all three of these positions, and invariably I help, if not stop, the hitting the first time trying. For horses that toe in I take a light shoe. I usually turn them myself and fit the

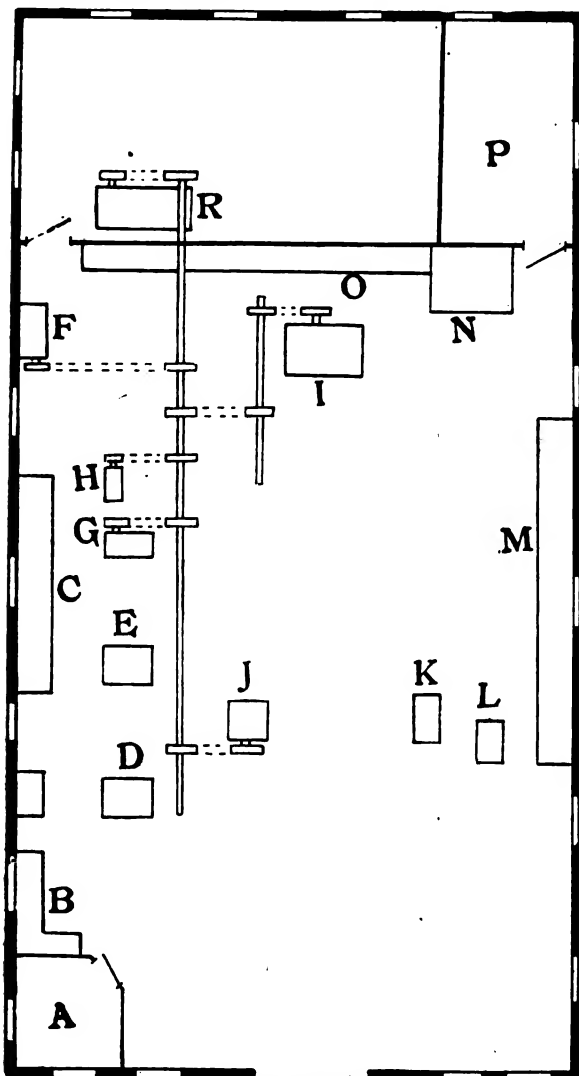
inside as straight as I can, and conforming to the foot. I always fit full, i. e., just flush with the foot in all cases, leaving the inside a little longer than the foot and turn the calk out. There is no danger that the horse will hit himself with a heel calk that stands in this position. With the outside I follow the foot right around and stop at the outside heel, toe calk in the center of the shoe.

The horse that toes out I fit inside exactly with the foot and stop exactly at the point of the heel, no calk at the inside heel, a low calk in the center, the outside brought round with the foot and bent out till a line drawn through the middle of the two bearings (inside and outside heels) will strike the center of the heel of the forward foot, the calk at the outside heel the same height as the toe calk. Dress the foot exactly level in all cases. I will add that I have had in mind interfering behind. For forward striking I depend largely upon the position of the toe calk, rolling motion and weight. I will give my way of shoeing for forward hitting at some future date.

A Well Arranged Shop of Washington.

The accompanying sketch shows the lay-out of C. R. Jamerthal's shop, at Roy, Washington. The gas engine used is a 2 H. P. Reliance made by the Beaver Manufacturing Co., Milwaukee, Wis.

- A. Represents the office.
- B. A bench.
- C. Iron rack.
- D. and E. Forges.
- F. Emery stand.
- G. Drill.
- H. Tennoning machine.
- I. Planer.
- J. Trip hammer.
- K. Tire shrinker.
- L. Tire bender.
- M. Hardwood rack.
- N. Spoke rack.
- O. Vise rack.
- P. Store room for shoes.
- R. Gas engine.



THE PLAN OF A WASHINGTON SHOP.

The horse that is in line I found the most difficult in times past, but I can now stop the hitting in nearly every case in this way: Cut off the inside of the shoe about one inch, draw down thin, and stop exactly at the heel, then weld a short calk just half way between the toe and heel, right in the crease, letting it stand in a very little, toe calk at center of shoe. The outside I let extend a very little beyond the heel. Do not bend much. If this does not stop the hitting entirely, I make the short calk that I welded on the inside a very little longer than the rest, perhaps $2\frac{1}{2}$ of an inch, and bend the outside heel in a little more.

Mr. Jamerthal is highly in favor of power in the shop, and says that his engine will operate six of his machines at one time and do it well.

The Gas Engine in the Small Shop.

R. A. PATTERSON.

Every smith who is running a shop, even on a small scale, cannot do everything without the use of a helper. What does the helper cost? He will surely demand as much wages in twelve months as the cost of the engine, and then you have the engine until worn out. With the engine you can run your drill, grind-stone, emery wheel, blower, or bellows, and you can add with very

little cost a trip hammer that will do the work better than any helper, and it will not have to stop and rest when you have a great deal of drilling or grinding to do. I hired a helper at \$12.00 per month for a year, costing me \$144. My engine cost \$105.75 put in the shop, which left me \$38.25 to fix up the shaft and pulleys and belting, which cost me \$37.20, leaving on hand \$1.05 from the wages of my helper. I can now turn out more work than with the helper, in better shape and much easier. I would advise any smith to drop the helper and get an engine which is better than two helpers, and if they will try it, they will find this to be the case.

The Carriage Builders' National Association Convention.

The Thirty-Second Annual Convention of the Carriage Builders' National Association held in Milwaukee, Wis., from October 17th to 22d, proved a great success in every respect. It was largely attended and most enthusiastic, and a generous program of entertainment was carried out in addition to the business transacted. The Association headquarters were at the Plankinton Hotel, the exhibits being displayed in the Exposition Building on Fifth street. Mr. Wm. W. Ogden of Newark was elected president for the ensuing year, and Philadelphia chosen as the next meeting place.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

For welding iron to malleable castings, they haven't found anything better in the shop than a mixture of sal ammoniac and borax, one to ten, melted together and ground fine.

Whenever the shop gets a case of thrush to handle, nothing seems to be better than thorough daily cleansing with hoof pick and dry oakum—no water. Finely powdered sulphate of zinc is good, too.

Order in the shop is one of the things the boss is continually preaching. He sets a good example, too. Attention to detail is one of his strong points, for, says he, the little things make up the big.

The tool smith never goes to sleep while handling high carbon steel. Were you to ask, he would tell you that the higher the heat and the more rapid the quenching, the coarser the grain; that oil does not cool the steel as quickly as water; mercury and brine more quickly than water.

A friend from Michigan writes that to his mind contracted feet are caused by high

heels and calks, with poor fitting, and that it can be overcome with bar shoes, properly made and fitted. It can also be remedied by using plain open shoes, no calks or heels concaving the heel end towards the outside. The heel ends should be fitted to come up close to the frog. Keep the foot soft.

Here's a little kink the boys in the shop sometimes find handy for putting a bolt head on a bar quickly where they haven't the stock to upset or where perhaps the rod is too long to handle that way conveniently. An ordinary blank nut is taken, one with a hole about a sixteenth less than the diameter of the rod, and is split with a hack saw from one side in to the hole, taking care to cut across the grain to prevent the opposite side from splitting. This is welded in place, leaving a bit of the rod to stick through so the head can be rounded up nicely. The object of the slit is to allow the nut to snug up in welding, for otherwise welding one side would tear away another.

It was noon at the shop, and the boss was giving the kid apprentice some pointers. "Always get good coal. Good coal breaks easily, and appears black and glossy all the way through. Coal that is streaked, first bright and then dull, and doesn't break easily, is poor. Look out for coal with dirt and slate in it. Sulphur in coal doesn't do it any good, but I think most smiths give sulphur more bad marks than it deserves. First, last and always, you want a coal that cokes up easily or else you'll have a dirty fire. Perhaps you've noticed that and perhaps you haven't. Always wet your coal down well before putting it on the fire. Never put green coal on a fire after once starting it, if you are particular about the work, but feed it with coke. Don't forget, boy, that to get the greatest heat from a piece of coal takes just so much air. If you give it more than that, you make your fire colder instead of hotter, cool your work, cause scale and lose in a lot of ways. If you treat your fire well, feed it a plenty, and keep it clean, it'll be one of the warmest fires you've got."

What we call steel differs from iron principally by how much carbon it has. Carbon is the nerve, you might say. Good wrought iron is the metal in its purest state—it contains less than one-half of one per cent. of carbon. Steel has from that up to 1½ per cent. Cast iron has as much as three per cent. of carbon. Steel is high or low carbon, according to whether it has much or little. Low carbon steel differs from wrought iron in that it is crystalline rather than fibrous; it resembles wrought iron by being tough, easy to weld and hard to temper. The more carbon steel contains, the greater its strength, the greater its brittleness, the harder to weld and the easier to temper. The properties of steel depend considerably upon its heat treatment. Sudden cooling of high carbon steel renders it exceedingly hard. This fact is taken advantage of to make cutting tools. The process is termed hardening. But this hardening often makes the steel too brittle. Then we resort to tempering, which increases the toughness at the expense of the hardness. The changing colors tell us when we have reached the proper temper. Carbon in steel is measured by so many points—100 point means one per cent. of carbon. Select your steel, whenever possible for the uses it is intended for. Adopt some good brand and stick to it. Learn all its kinks and humors. If you keep changing your brand, you'll be in hot water all the time. Take great care in heating—do it evenly and uniformly. You know that metals expand when heated or vice versa. If heated or cooled unevenly it expands or contracts unevenly. What's the result? Cracks.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Cold Chisels.—Will some brother smith tell me the best method for tempering cold chisels? JESSA A. DEES.

Foot Power Hammer.—I would like very much to ask in THE AMERICAN BLACKSMITH if a foot-power trip hammer pays. Can some smith say? J. B. PRIDDY.

Regarding a Gas Engine.—In reply to John Day's query in the September AMERICAN BLACKSMITH, I will say that from the amount of work you do, that could be done on an emery wheel, it would pay you to put in a gas engine. G. ENGINE.

Belows vs. Blowers.—I have been using bellows for about 35 years; would some brother craftsmen, through the columns of THE AMERICAN BLACKSMITH, let me know from their own experience, if a blower would be superior? BERNARD PARSONS.

Pig Iron and Mild Steel.—How can you melt pig or soft iron so that it will be something like mild steel or a little better than malleable iron when it is cast or poured into a mold? Also about how should it be alloyed to get this kind of casting? Will some brother tell me? THOMAS A. MCKAY.

Hardening Small Rolls.—If Mr Hussey will make a bath by dissolving one pound of citric acid crystals in one gallon of water and dip his rolls in this, when ready to harden I think he will have bearings hard enough. Use the same proportion in any size bath. HARD.

Fistula.—I will send my receipt to the brother smith requesting a remedy for fistula, one which I have never known to fail. Take enough of corrosive sublimate, bluestone and verdigris to fill a 00 capsule, putting in one-third of each kind of powder. Never mix until put in the capsule. Place it in the running sore, pushing down with a small stick on the tube. Put in every third day. JESSA A. DEES.

Circles.—This is the way in which I get the length of iron for circles. Take for instance a 7-inch circle. Seven times 3 1-7 or 22 inches would be the length for thin stock. Or say the diameter is 21 inches. Three times this or 63 inches you mark on your iron. Then one seventh of 21 is three, and adding this on makes another mark at 66 inches. If the stock has to be, say two by two inches, add the thickness four times, giving 74 inches, at which place the bar is to be cut. If your bar is ½-inch, just add four times the thickness, or if you don't weld, just three times. Try the method on your next circle. ALFRED LOXTON.

How to Make a Bar Shoe.—Take a good factory shoe, one size larger than the horse generally wears, fit it to the foot and make a chalk mark at the heels where you want the bar to come. Now even the foot and mark the shoe with a center punch, then heat the heels and sharpen them ready to weld. Now take another heat and bend the shoe, in the vise, where you marked with

punch, and then weld and finish off nicely. You can now weld on calks and toe if you prefer, but be sure the shoe fits the foot before you weld, as a bar shoe is not very handy to change when done. Do not make the bar too light or it may bend when the horse steps on a stone. O. W. TAYLOR.

Shoeing a Pacing Horse.—In answer to Wm. Hallenberg's question on shoeing a pacing horse, wish to say that I have had good success with a real heavy shoe in front, say No. 2; and a light No. 1 behind. If the horse is very hard to stop, then shoe with a double bar shoe made as follows: Take a plain shoe, fit to the hoof, and then taking a rod of ½ square, or ¾ square, according to weight of shoe, weld it across the shoe 1½ inches from the toe. Weld another across the heel, say one inch from heel. This may be changed a trifle according to the size of shoe. This shoe will have an action on the horse that will aid to stop him from pacing. CHAS. D. BRIDDELL.

A Letter from Maine.—Although I run a general blacksmith shop, doing shoeing and jobbing, I take much more interest in horse shoeing than I do in the jobbing part of it. This may be because I am having very good success in this line, and one is likely to prefer that which he has the most success in. I have a ten-horsepower motor (more than twice the power I need) which runs a Beaudry power hammer, a Western Chief No. 14 drill press, an emery wheel and a blower. I shall soon add to these a thread cutting machine.

With my power hammer I make all kinds of swage work in the horseshoe line, especially light trotting shoes, and all the heavy welding and drawing in the jobbing line. F. T. BROWN.

Oklahoma Prices.—Will gladly and willingly say that THE AMERICAN BLACKSMITH paper to the craft in general, according to my observation, is the best periodical of the kind known. We are having a good run of work here, and it will continue for some time yet. A few prices might be of benefit to some of the readers of THE AMERICAN BLACKSMITH, the much-valued journal:

Shoeing, per horse.....	\$1.50
Plow shares, 16-inch.....	3.50
Plow shares, 14-inch.....	3.25
Plow shares, 12-inch.....	3.00
Sharpening shares, each.....	.25
Sharpening lists.....	.40
Setting tires, per set.....	2.00

We have no engine equipped shop here yet, but are contemplating putting in one soon. MILES THAYER.

Holding Fire.—Prices.—As I have sat back in the corner quite long enough, I thought I would just see how this item would strike the craft. As to keeping fire in the forge, I would just suggest for the brothers to open the bottom of their tuyere iron and they can hold their fire all day if they want to.

The prices here in Iowa are as follows:	
New shoes, per pair.....	\$.80
Old shoes, per pair.....	.40
Setting wagon tires.....	2.00
Setting buggy tires.....	2.00
Wagon tongue.....	2.00
Buggy tongue.....	\$2.25 to 2.50
Bolster, hind or front.....	1.25
Front hounds, per pair.....	1.50
Wagon axles.....	\$2.50 to 3.00
Welding buggy stubs, per weld.....	.50

L. E. PHIFER.

From Mississippi.—I have silently admired your paper for more than a year. In it I find many helpful hints. I look for each copy with much interest, and as soon as it comes I look through it to see what is new. I have a shop 16 by 40, (rather narrow) but I need an engine to drive my rip saw, lathe,

drill, grind-stone and several other small machines. Will you kindly advise me which is the very best and most up-to-date gasoline or kerosene engine made? I came here four years ago, found a brother smith well rooted and working at low prices, and was kept busy doing and doing over. I set up and did a little machinist work which he could not do, and had lots of rest, for my brother craftsman said he had forgotten more than I had ever known, but after brightening my ideas with the pages of THE AMERICAN BLACKSMITH, and doing all the jobs my brother smith could not do, I find, if I keep up with business, I will have to do it by steam, gasoline, kerosene or some other power. Hence this appeal to you in regard to the engine. ROEMER JOHNSON.

One of Many.—I have been a subscriber to your paper for some time. I think the paper is worth many times the price you ask for it to any blacksmith or wagon builder, if he is not one of the wise fellows, that knew everything before he commenced to learn his trade. I have had a number of men work for me of that kind, but never kept one of them long, as I have no use for a man that can't learn any more. I have been blacksmithing for the last twenty

To make a wedge splitter take an old half spring and weld a piece of $\frac{3}{4}$ -inch gas pipe onto the thin end; this is for the handle. Now commencing about one inch from the hole in the other end of the spring and for about $2\frac{1}{2}$ inches, draw the edge out sharp. See A in the drawing. Then take a piece of 2 by 4 oak, shape and cut it as shown and hinge the cutter in the slot cut for it. By screwing the piece of 2 by 4 in the vise you can split wedges as fast as anyone can make them.

When putting a new handle in a hammer, to be used at the anvil, try the following: Cut a $\frac{3}{4}$ -inch piece out of the handle about two inches from the hammer head, and slot each end of cut to receive a piece of spring steel. Refer to sketch. I use steel $\frac{1}{2}$ -inch thick, and as wide as the handle. Now fasten steel with good rivets and you will be surprised to see how much better you will like your hammer. J. W. SMITH.

Better Prices.—Don't class me with Mr. Tom Tardy, for I am not just like him. I have a good shop, first-class business, my tools are up-to-date, and in fact I pride myself on being up to date in everything. We do not get our pay in advance for a job before we undertake to do it, and would be

getting really more work than ever, for the simple reason that getting more pay for our services, we can afford to spend more time to do our work properly, give better satisfaction and we get more custom as a consequence. W. F. TAYLOR.

An Interesting Letter from Australia.—I am at present situated in Queensland, which is principally a German settlement, and as most of the smiths are German, they do not understand such things as trade journals. However, I wish to be of help to THE AMERICAN BLACKSMITH, and in the future will do my best in getting new subscribers and supplying items of interest.

I am obtaining a few more photographs, one of them being very novel, inasmuch as it is a wagon which was built entirely by a man with one arm, to draw his bit of produce out of the scrub.

The ad. cut which I enclose I suppose you will laugh at and wonder about it when you see it, as many about here have done on reading it. Here it is:

WANTED—To buy a few crippled horses. Must be cheap. Apply, ADVOCATE OFFICE.

Well, it is one of my advertisements. Being a young man and full of ambition, I decided to get several crippled horses for experimental purposes. I now have five. Of all the sorriest looking creatures you ever saw, these beat them all. To see them in the paddock with their various ailments reminds one very much of a circus, and I believe it is one of the greatest paddocks full of cripples one could find. I intend sticking to them and hope to learn a lot which in the future will be of advantage to me.

I am going to settle down here in Queensland, although I prefer Victoria. The climate in this section is more tropical and the country better, but as it is not so thickly settled it is not therefore so progressive, and the class of work here does not come up to that in Victoria. We have splendid timber here in Queensland, suitable for the trade, including brigalow and ironbark, which are used for spokes; yellow wood, which I think is almost equal to hickory, for carriages or body frames, together with pine, silky oak, bean wood and many other kinds which are all used in vehicles, both light and heavy. I believe it is only a matter of time when the timber in America, especially hickory, will run out, and they will be looking to us for a supply.

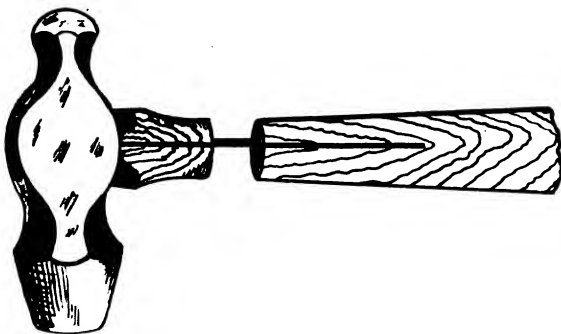
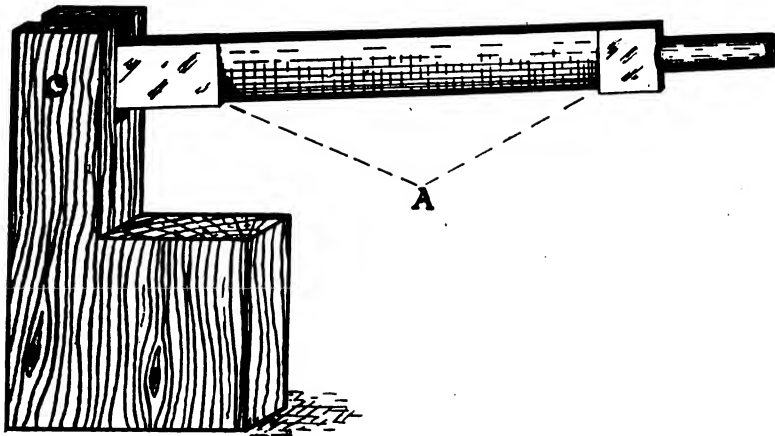
We have only a few implement works here, and most of the machinery and farming implements are imported from America. Massey, Harris and Planet, Jr., are the principal makers of implements used, but I am looking forward to the time when some large company will open a works in Australia instead of shipping their stuff out and so keep the money in the country. We have plenty of iron ore here, as well as coal, and in this district you can almost strike a seam anywhere, but we have no use for it, as there are collieries nearer to the coast. Wishing THE AMERICAN BLACKSMITH all the success in the world, as it deserves, I am. R. C. LEONARD.

Price List Adopted by Mechanics' Protective Association of South Dakota.

All labor from 6 o'clock P. M. to 12 o'clock P. M. is charged time and a half; 12 o'clock P. M. to 6 o'clock A. M., is charged double time.

Blacksmithing. HORSE SHOEING.

Setting shoes.....	each, \$	.20
New shoes.....	"	.40
Hand-made shoes.....	"	.75
Bar shoes.....	"	.75
Steel plugs, extra.....		.10
Paring feet, per foot.....		.5



A HANDY WEDGE SPLITTER AND A NEW WRINKLE IN HAMMER HANDLES.

years and I am proud to say that I have found many good points in THE AMERICAN BLACKSMITH. I wish that every blacksmith in the world would read your valuable paper, as I think it would make us more brotherly and we could get better prices for our work and be more neighborly. I think it's a valuable paper for the craft to read. I also appreciate your effort to improve your paper, as the rule I go by is to try and make improvements and to have something better. I think your ads. are very helpful in buying tools and stock. I will write and tell you about my shop and tools later on. W. H. WIGNET.

Wedge Cutter—Hammer Handles.—I see some very useful tools explained in THE AMERICAN BLACKSMITH, and give the following hints as being very good.

mighty thankful to get it when the job is done, but such is not the case. We have to wait for first-class customers sometimes two or three years, but does not the fault all lie with ourselves? There is no reason, to my mind, why the blacksmith should not get his cash for his work when done. Suppose we should all get our heads together and say, "No more credit," what would be the consequence? Would the world go on just the same? In my estimation the business world could not go on turning more than a month at the outside without the blacksmith. Therefore all we have to do is to organize. In our town we recently raised the price of shoeing 25 cents a set for new shoes, and 10 cents a set for resetting old ones. Did our customers all leave us and go to some other town? Not so; we are

PLOW WORK.

Polishing plow.....	\$1.00
New lays.....	\$3.50 to 4.00
Pointing and sharpening lay.....	.75
Sharpening and putting heel on lay..	.75
Sharpening lay only.....	.30
Sharpening and hardening lay.....	.40
Sharpening, hardening and polish lay	.50
Heel on landside.....	.50
Sharpening coulter.....	.50
Coulter hubs.....	40c. to 60
Coulter hub pin.....	.10
Caster Coulter shank.....	1.00
Fork coulter shank.....	.75
Coulter clasp.....	40c. to 50
Coulter blades.....	\$1.25 to 1.50
Coulter, complete.....	2.50 to 3.50
New steel plate on landside.....	1.50
New iron landside.....	1.00
New mouldboard.....	5.00
Putting on new standard cap.....	1.00
Putting in new steel beam.....	\$3.50 to 5.00
New set clevises on beam.....	.75c. to 1.00
Twist clevis.....	.15
Cross clevis.....	.25
Clevis for one side of beam.....	.25
Gage wheel, complete.....	1.00
Gage wheel irons, per pair.....	.50
Gage wheel irons, one.....	.25
Sharpening road grader knives.....	\$1.00 to 2.00

CARRIAGE WORK.

Axle stubs.....	each, \$ 2.00
Axle stubs, 1 in.....	set, 7.00
Axle stubs, 1½ in.....	7.50
Axle stubs, 1½ in.....	" 8.00
Setting axles.....	.75
Taking out and putting in axles.....	.50
New set of tires, 1½x½.....	6.00
New set of tires, 1½x½.....	6.50
New set of tires, 1½x½.....	7.00
Setting buggy tires.....	set, 2.50
Setting buggy, one tire.....	.65
Ironing buggy pole, new.....	3.00
Ironing set of buggy whiffletrees, new	1.00
Pole and shaft couplings, each.....	.75
Ironing shafts, new.....	2.00
New fifth wheel put in.....	\$1.50 to 2.50
Clip king bolt put in.....	1.00
New buggy springs put in, per lb, 12½c.	to 25
One leaf put in spring.....	1.00
Welding spring.....	.50
Ironing lazy-back.....	.50
Buggy clip, complete.....	10c. to 25

WAGON WORK.

New set of wagon tires, ½x1½.....	\$7.00
New set of wagon tires, ½x3.....	8.00
Cutting down and setting old tires..	3.00
Setting wagon tires.....	set, 2.00
Setting wagon tires, one.....	.50
Setting wagon tires, wide.....	.75
Drilling holes in tires.....	3 for .25
Ironing pole, new.....	2.00
One new iron on pole hounds.....	.25
Pole cap.....	.50
Hammer strap.....	.35
Draw bolt.....	.25
Wagon wrench.....	.35
King bolt.....	.35
Ironing wagon box, new irons.....	3.50
Putting old irons on box.....	\$1.50 to 2.00
Wagon box rods.....	15c. to 25
Old iron put on top box.....	.50
New set bolster plates.....	1.00
New center clip on whiffletree.....	.20
New hook on whiffletree.....	.10
All new irons on whiffletree.....	.35
Finished wagon whiffletree.....	.50
Finished wagon neck-yoke.....	.75
New center put on neck-yoke.....	.35
Putting old irons on neck-yoke.....	.20
Ironing lazy back on seat.....	.50
Seat hooks, set.....	.50
Putting on one new seat spring.....	.75
Putting on two seat springs, new...	1.25

MOWERS.

Welding axle.....	\$2.00
Two welds on sickle.....	.75
One weld on sickle.....	.50
Filing mower sickle.....	.50

Filing harvester sickle.....	\$.75
Sharpening guards, each.....	.05
Taking off and putting on bolted	
guards.....	.05
Taking off and putting on riveted	
guards.....	.10
Putting plates on guards.....	.05
Welding Pitman.....	.50
New hook on Pitman.....	.50

HARROWS AND SEEDERS.

Sharpening harrow teeth.....	\$ 0.01
Taking out and putting in harrow	
teeth.....	.01
Sharpening seeder teeth.....	.10
Sharpening drill shoes.....	each, .20
Setting tire on press wheel.....	" .25
New steel heel on shoes.....	" .35

MISCELLANEOUS.

Dressing stone hammers.....	\$0.50
Link in chain.....	5c. to 10
Link and hook in chain.....	.25
Steel shoes on cutters.....	\$2.00 to 3.00
Clevises, hand-made.....	20c. to 30
Sharpening discs.....	30c. to 50
Sharpening picks.....	.20
Sharpening cultivator shovels, set...	.75
Welding cylinder shafts.....	2.00
Welding counter shafts.....	1.50
Iron sleigh tongue.....	2.00
Welding shanks on forks.....	15c. to 25
Welding fork tines.....	15c. to 25
Miscellaneous work, per hour...	30c. to 60

Wood Work.

BUGGIES.

Sarven B wheels, per set, old tires..	\$16.00
Sarven C wheels, per set, old tires...	14.00
One new C wheel, old tires.....	4.00
Rimming set wheels.....	6.00
Half Rim.....	.75
Rimming one wheel.....	1.50
Patent spokes.....	25c. to .35
Common spokes.....	20c. to .25
Set box in new wheel, each.....	.50
Set box in old wheel.....	.35
Buggy pole, complete.....	\$6.00 to 8.00
Pole and circle put in.....	3.00
Pole put in.....	2.50
Circle put in.....	1.00
Whiffletrees, complete.....	2.00
Evener put in.....	.75
Singletree put in.....	50c. to 75
Neck-yoke, wood, put in.....	.50
New shafts, wood only.....	\$2.00 to 3.00
One new shaft put in.....	\$1.50 to 2.00
Cross bar in shaft.....	1.00
Axle beds.....	\$1.50 to 2.00
Spring bars.....	1.00 to 1.50
Side bars.....	1.00 to 2.00
Reaches.....	1.00 to 1.50
Head blocks put in.....	1.00
Sockets put in buggy tops.....	.75
New bow in top.....	\$1.50 to 2.50
Back curtains.....	each, 1.50
Side curtains.....	" 1.25

WAGON WORK.

Filling set of wheels.....	\$14.00
Filling one hind wheel.....	4.00
Filling one front wheel.....	3.50
Filling hind wheel with spokes.....	2.50
Filling front wheel with spokes.....	2.25
Rimming set of wheels, sawed felloes.	6.00
Rimming set of wheels, bent felloes..	7.00
Bent rims put on one wheel.....	1.75
Half bent rim put on.....	1.00
Sawed felloes.....	each, .25
Spokes.....	" .20
Putting new hub in wheel.....	1.50
Cutting down and new rims, set....	7.00
Cutting down and new wide rims, set	8.00
Tongue and hounds put in.....	3.00
Tongue put in.....	2.50
One tongue hound put in.....	.75
Two tongue hounds put in.....	1.25
Cross piece put in.....	.40
Axles, each.....	3.00
Axles for separator.....	4.00
Reaches.....	\$1.00 to 1.25
Hind hounds, each.....	1.00
Hind hounds, per pair.....	1.75

Bolster, front.....	\$1.50
Bolster, hind.....	1.75
Sandboard put in.....	1.50
Bolster stakes.....	25c. to 75
Bent hounds.....	3.00
New box, one coat of paint.....	8.00
New bottom put in box.....	\$2.50 to 3.00
One cross-piece on box.....	.50
End gates.....	50c. to 75
Wagon box, one side.....	2.00
Wagon box, two sides.....	3.50
Top wagon box, new.....	3.00
Wagon seat, wood only.....	2.00
New wagon seat, complete.....	3.50
Spring blocks, each.....	.25
Lazy-back, wood only, put on.....	.25
Doubletree, wood only.....	.35
Doubletree bored and bolted.....	.50
Singletrees, wood only.....	.20
Whiffletrees, complete, set.....	2.00
Neck-yoke, wood only.....	.30
One new skein on axle, no box in wheel	1.50
New skein and box in wheel.....	2.00
One new box in wheel.....	.75
New set skeins, no box in wheels....	5.00
New set skeins and new box in wheels	7.00
Putting nut on skein.....	25c. to 50

SLEIGHS.

New Tongue and Roller put in.....	\$ 2.50
New tongue put in.....	2.00
New roller put in.....	1.00
Bench beam put in.....	2.00
Mandt beam put in.....	1.50
Reach put in.....	1.00
Bolster.....	\$1.00 to 1.50
One runner put in.....	2.00 to 2.50
Raves put in.....	1.00

CUTTERS.

Beams put in, one.....	\$ 1.00
Beams put in, two.....	1.75
Beams put in, three.....	2.50
Knees, each.....	.75
Runners put in.....	\$1.50 to 2.00
Shafts same as buggies.....	

PLOW AND HARROWS

New beam in plow.....	\$1.50 to \$2.00
One new handle.....	.75
Rounds, each.....	.10
Harrow Beam put in.....	.75
Harrow Slats put in.....	.25
Harrow evener for two sections.....	.75
Harrow evener for three sections....	1.00
Harrow evener for four sections.....	1.50
4-horse eveners, wood only.....	.75
3-horse eveners, wood only.....	.50
Miscellaneous work, per hour...	25c. to 50

Machine Work.

BOILER TUBES.

2-inch tubes, per foot, put in.....	\$0.35
2½-inch tubes, per foot, put in.....	.41
3-inch tubes, per foot, put in.....	.48
4-inch tubes, per foot, put in.....	.64

WELDING TIPS ON OLD TUBES.

4-inch tip on 2-inch tube.....	\$0.40
4-inch tip on 2½-inch tube.....	.50
4-inch tip on 3-inch tube.....	.75
4-inch tip on 4-inch tube.....	1.00
Expanding set of old tubes... \$5.00 to 15.00	
Boiler work, per hour.....	.60

ENGINE.

Reboring threshing cylinder.....	\$15.00
New set, three rings.....	7.50
Single rings.....	3.00
Facing valve and seat.....	5.00
Refitting crank pin and brasses.....	3.00
Refitting crosshead pin and brasses..	3.00
Refitting link motion.....	\$5.00 to 15.00
Refitting marsh gear.....	3.00 to 8.00
Setting valve, plain.....	5.00
Setting valve, traction.....	7.00

MISCELLANEOUS.

Straightening counter shafts.....	\$3.00
Straightening cylinder shafts.....	3.00
Boring gear counter shaft.....	3.00
New tooth in bull wheel.....	2.00

Bench work, 50 cents; lathe, planer or drill work, 75 cents per hour. LEE BROS.

SUPERIOR Horse Rasps

The Best Yet

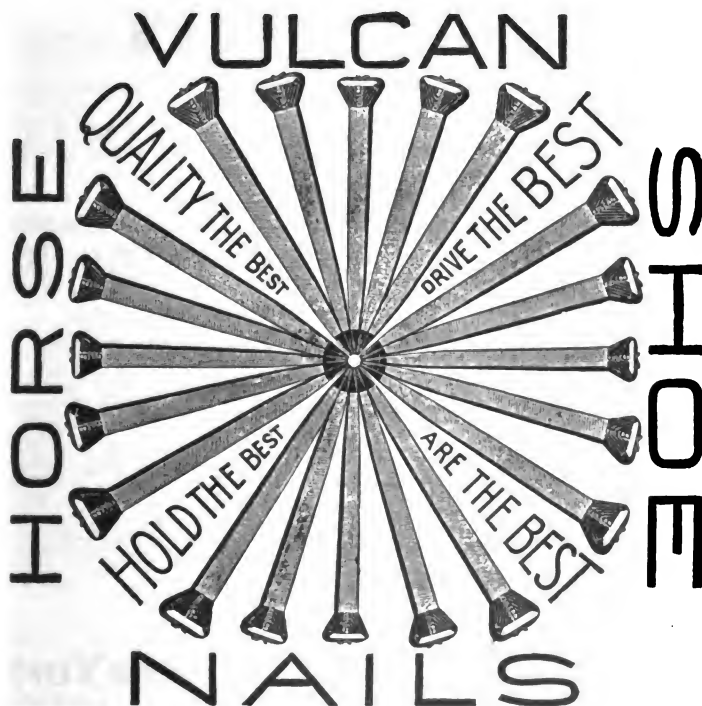
Best High-grade Steel.

Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim,
which gives the user the advantage of a long stroke,
and at the same time a rasp of medium weight.

Ask Your Dealer For Them



THE FOWLER NAIL COMPANY, SOLE MANUFACTURERS, SEYMOUR, CONNECTICUT.

Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Oct. 20, 1904, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

$\frac{1}{4}$ in., round or square; Iron, \$2.80; Steel, \$2.90
$\frac{3}{8}$ in., " " " 2.40 " 2.40
$\frac{1}{2}$ in., " " " 2.20 " 2.20

Flats—Bar and Band.

$\frac{1}{4}$ x 1 in., Iron, \$2.20; Steel, \$2.20
$\frac{1}{2}$ x 1 in., " 2.10; " 2.10
$\frac{3}{8}$ x 1 in., " 2.80; " 2.80

Norway and Swedish Iron.

$\frac{1}{4}$ in., round or square, \$4.90
$\frac{3}{8}$ in., " " 4.50
$\frac{1}{2}$ in., " " 4.80
$\frac{3}{4}$ x 1 in., " 4.80
$\frac{1}{2}$ x $\frac{1}{2}$ in., " 4.20

Horseshoe Iron.

For No. 1 shoe, $\frac{3}{4}$ x $\frac{1}{2}$ in., \$3.20
For No. 2 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.90
For No. 3 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.90
For No. 4 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.90

Toe Calk Steel.

$\frac{1}{2}$ x $\frac{3}{4}$ in. and larger, \$3.00
--

Spring Steel.

$\frac{1}{4}$ to $\frac{1}{2}$ in. Rounds, Op. Hearth \$3.00, Crucible \$5.00
$\frac{1}{4}$ to $\frac{1}{2}$ in. by No. 4 gauge to $\frac{1}{2}$ in. Flats " 3.00, " 5.00

Carriage Bolts. (Net Price per Hundred).

$\frac{1}{4}$ x 2 in., \$0.54	$\frac{3}{8}$ x $\frac{1}{2}$ in., \$0.82
$\frac{1}{2}$ x $\frac{1}{2}$ in., .58	$\frac{3}{8}$ x $\frac{3}{4}$ in., .96
$\frac{1}{2}$ x 8 in., .63	$\frac{3}{8}$ x 8 in., 1.81
5-16 x 2 in., .65	$\frac{1}{2}$ x 4 in., 1.70
5-16 x 8 in., .75	$\frac{1}{2}$ x 6 in., 2.10

PADDOCK-HAWLEY IRON CO.

Iron, Steel, Carriage and Heavy Hardware,
Trimings and Wood Material.

ST. LOUIS, MO.

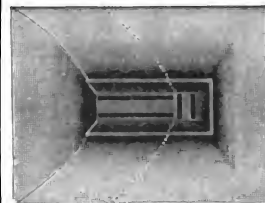
CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.



DEATH TO HEAVES
Guaranteed
Newton's Horse, Cough, Dis-
temper and Indigestion Cure.
A veterinary specific for wind,
throat and stomach troubles.
Strongly recommended, \$1 per
con. Dealers, mail or Ex. paid.
Newton Horse Remedy Co.
(3) Toledo, Ohio.

\$500 SPECIAL PRICE



on the celebrated
Thompson Extension
Tuyere Iron.
All your Tuyere

Iron troubles will
end if you have one
THOUSANDS IN
USE.

This Tuyere Iron and Fire Pot saves time, coal and money. It's
no experiment. Can get a fire from 2 to 14 inches long. GUAR-
ANTEED: sent on receipt of price. WHY NOT HAVE THE
BEST? WILL PAY FOR ITSELF IN SHORT TIME.

THOMPSON TUYERE IRON CO.
2209 N. N. JERSEY ST., Indianapolis, Ind.

WANTED AND FOR SALE.

Want and for sale advertisements, situations
and help wanted, twenty-five cents a line. Send
cash with order. No charge less than fifty cents.

FOR SALE.—One Noiseless Buffalo Forge Com-
pany's 16-inch fan, as good as new.

ARTHUR D. GORE,
Sinnemahoning, Pa.

WANTED.—To buy a good strong second-hand
Band Saw.

EDMUND SHUMAKER,
Virden, Ill.

WANTED.—Young man with experience to
open blacksmith and repair shop, horseshoeing, etc.
Fine two-story shop 24x48 feet, in country town.
Liberal inducements.

V. H. CHASE,
Wady Petra, Ill.

I CAN SELL YOUR BLACKSMITHING
BUSINESS (with or without real estate) no
matter where it is or what it is worth. Send
description, state price, and learn my wonderfully
successful plan.

W. M. OSTRANDER,
109 North American Bldg., Philadelphia.

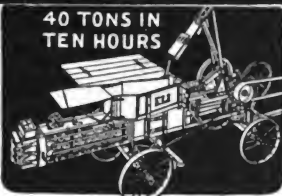
Trade Literature and Notes.

THE CATALOGUE of Wells Bros., Greenfield, Mass., is one that should be in every smith and wagon shop, on account of the complete line of tools illustrated. When sending, mention this paper.

NEVERSLIP MANUFACTURING COMPANY New Brunswick, N. J., whose interesting and attractive advertisement appears on page VII, are issuing an interesting catalogue referring to their Neverslip pads, which they desire to place in the hands of every AMERICAN BLACKSMITH reader. These catalogues are free to all interested.

ATTRACTIVE as well as practical is the catalogue now being issued by the Dean-Waterman Company, of Covington, Ky., whose unique advertisement appears in THE AMERICAN BLACKSMITH for the first time on page XXIII of this issue. They advise us that the marked simplicity of their engines has been very favorably commented upon, and that in their catalogue they have endeavored to set forth in detail every feature of construction, and urge prospective buyers to examine their claims thoroughly. This catalogue is one of 24-pages, handsomely illustrated, with complete tables and other interesting data, and will be sent free upon request. Mention THE AMERICAN BLACKSMITH.

40 TONS IN
TEN HOURS



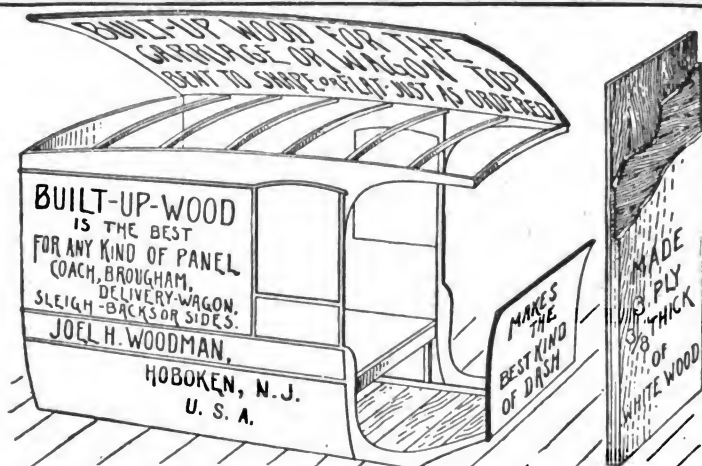
"ELI" Against the Field.

It leads in power, in speed, in safety, in convenience and ease of operation and makes compactest and shapeliest bales.

HAY BALER WITH A RECORD,

the pride of shippers. Steel or Wood, Horse or Steam Power. Such automatic features as self-feeding, block placing, hay condensing, bell ringing, etc. 48 styles and sizes. Get free Eli catalog

COLLINS PLOW COMPANY, 2011 Hampshire St., Quincy, Ills.



SPECIAL OFFER

Five horse-power gasoline engines, price \$130.

Material and workmanship the very best. Fully guaranteed. There is no better engine on the market. Just the engine for blacksmiths, woodworking shops, etc., and for all power purposes. Our engines possess new features not found on any other engine, and use less gasoline. Send for circular and particulars to

CLARK MFG. CO., Station "A" Fond du Lac, Wis.

Schofield's Steel Runner Attachment

For Wheeled Vehicles.



Are the Lightest, Strongest, Neatest and Cheapest made in America; and are also used in the construction of light Bob Sleighs. Send for illustrated circular, showing how it is done, to **SCHOFIELD & CO., 56 Cherry St., Freeport, Ill.**

New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.



Write for circular and particulars.

912 W. Lake St. CHICAGO.

TRIUNE COLOR VARNISH

(THREE IN ONE)

FIRST — Color

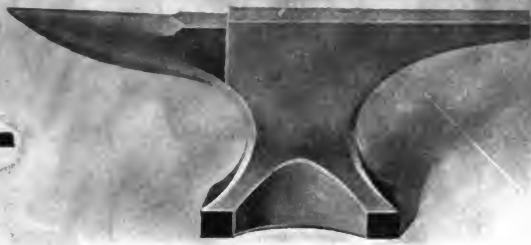
SECOND — Power To Cover ONE Coat

THIRD — Straight Varnish Working Properties and Qualities

The Three Essential Features
for a True Color Varnish.

TEN POPULAR SHADES

F. O. PIERCE COMPANY, 170 Fulton St., New York



THE RING OF AN ANVIL TELLS ITS QUALITY

Columbian All-Steel Anvils

have the true ring of excellence. Made from special ingot steel by the most skilled workmen. Our special guarantee goes with every anvil.

COLUMBIAN HARDWARE COMPANY:

Our blacksmith reports the anvil you sent us first class in every respect.
A. M. Forbes Cartage Co., Chicago.



EVERY VISE OF OURS IS FULLY WARRANTED

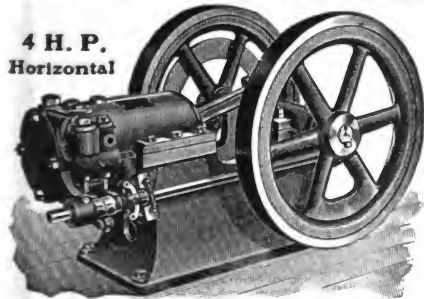
Our Solid-Box Wrought-Steel Vises

have jaws forged from one piece of special ingot steel and faced with high-grade crucible tool steel. Our Horseshoer's vise is made to turn both calks at one heat on flat front jaw.

Send for our handsome catalogue, free.

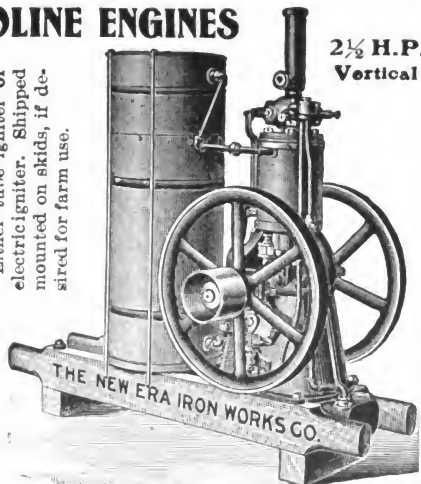
COLUMBIAN HARDWARE COMPANY
CLEVELAND, OHIO

LITTLE GIANT GAS & GASOLINE ENGINES



4 H. P.
Horizontal

Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.



2 1/2 H. P.
Vertical

Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.

No. 63 Dale Ave., DAYTON, OHIO.



Does The Saddle Gall You?

Does the close confinement to uncongenial drudgery irritate and chafe you?

Throw off the saddle. Get out of the unprofitable and uncongenial work where progress is nearly impossible. There is no reason why you should not be the rider.

The I. C. S. system of training by mail will put you in the saddle and help you to earn a better salary and position. We have done it for thousands of others—we can do it for you.

We can qualify you for any position mentioned in the coupon. Decide today to better your condition—then let us help you.

Mark **X** before the position that interests you, fill in the coupon, and mail it to us. We will send full particulars.

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 1302, Scranton, Pa.

Please send me a free copy of "1001 Stories of Success," and explain how I can qualify for position before which I have marked **X**.

<input type="checkbox"/> Mechanical Engineer	<input type="checkbox"/> Civil Engineer
<input type="checkbox"/> Mechanical Draftsman	<input type="checkbox"/> Bridge Engineer
<input type="checkbox"/> Machine Designer	<input type="checkbox"/> Surveyor
<input type="checkbox"/> Electrical Engineer	<input type="checkbox"/> Mining Engineer
<input type="checkbox"/> Municipal Engineer	<input type="checkbox"/> Mine Superintendent
<input type="checkbox"/> Heat and Vent. Eng.	<input type="checkbox"/> Architect
<input type="checkbox"/> Chemist	<input type="checkbox"/> Bookkeeper
<input type="checkbox"/> Sheet-Metal Draftsman	<input type="checkbox"/> Stenographer
<input type="checkbox"/> Sanitary Engineer	<input type="checkbox"/> Ad. Writer
<input type="checkbox"/> Electrician	<input type="checkbox"/> French } With
<input type="checkbox"/> Stationary Engineer	<input type="checkbox"/> German } Edison
<input type="checkbox"/> Marine Engineer	<input type="checkbox"/> Spanish } Phonograph

Name _____ Age _____

St. and No. _____

City _____ State _____

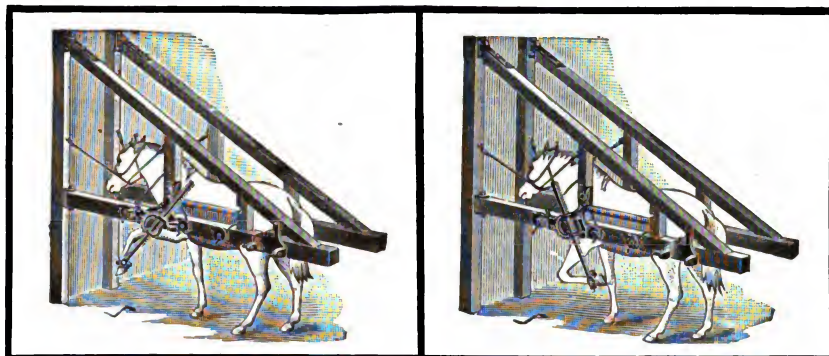
Fac-Simile Letters

FOR
Circularizing and Follow Up Systems

Look like the original and bring results. Furnished complete with names filled in or ribbons to match.

LERNER-BEAN CO.,
363 Washington St., BUFFALO, N. Y.

BARCUS STOCKS



Horse Stocks stand between you and injury for life. Hence it is false economy to buy any but the best.

Barcus Stocks Are the Best

They are the best because they are the only ones absolutely guaranteed to hold any horse perfectly without danger to either horse or man. Because all danger of getting kicked or hurt while fastening a rope or strap, as all other makes of stocks do, around a horse's foot, is thus prevented. Because you can place any foot in any position instantly. Because guaranteed not to chafe the foot.

Simple, Perfect, Reliable, Tested and Guaranteed.

The best machine ever placed on the market for holding and taming vicious horses and mules. Quickly adjusted, safely operated, sure to hold. Satisfaction guaranteed. ∴ The increasing demand for Barcus Stocks made necessary our removal to larger and finer quarters, where we are better equipped than ever.

Send for catalogue telling all about the Barcus Stocks.

GEO. BARCUS & COMPANY
Box 61 Wabash, Ind., U. S. A.
Canadian Horse Stock Company, Hamilton, Ontario, Canada

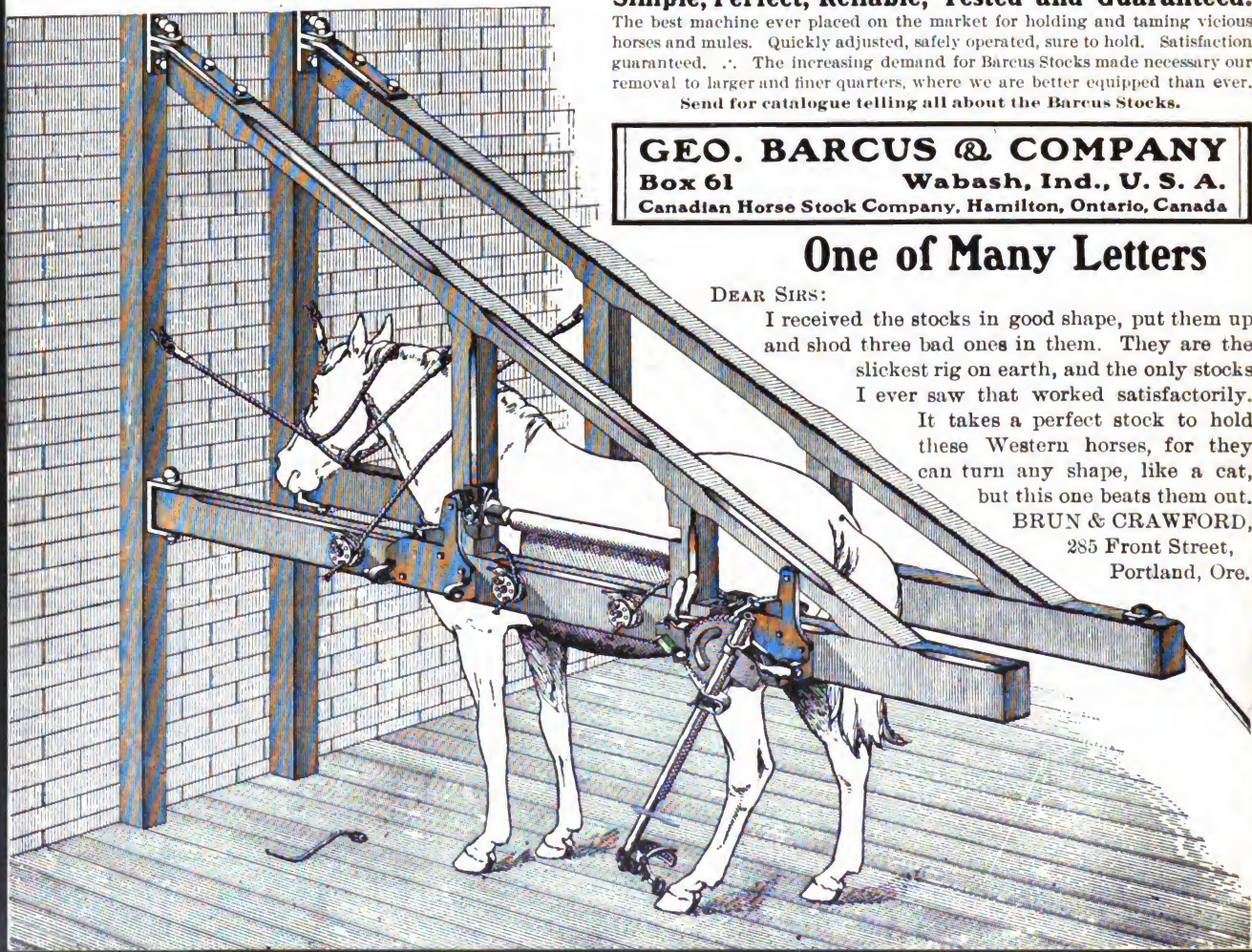
One of Many Letters

DEAR SIR:

I received the stocks in good shape, put them up and shod three bad ones in them. They are the slickest rig on earth, and the only stocks I ever saw that worked satisfactorily.

It takes a perfect stock to hold these Western horses, for they can turn any shape, like a cat, but this one beats them out.

BRUN & CRAWFORD,
285 Front Street,
Portland, Ore.



RELIANCE GAS AND GASOLINE ENGINES

SPECIAL NOTICE TO BLACKSMITHS

We will ship to any responsible blacksmith in the United States a Reliance Engine on 30 days' trial. If the engine does not prove entirely satisfactory it can be returned at our expense.

How could we afford to make this proposition if our engines were returned? Purchasers of Reliance engines get the best engine money will buy and are always satisfied.

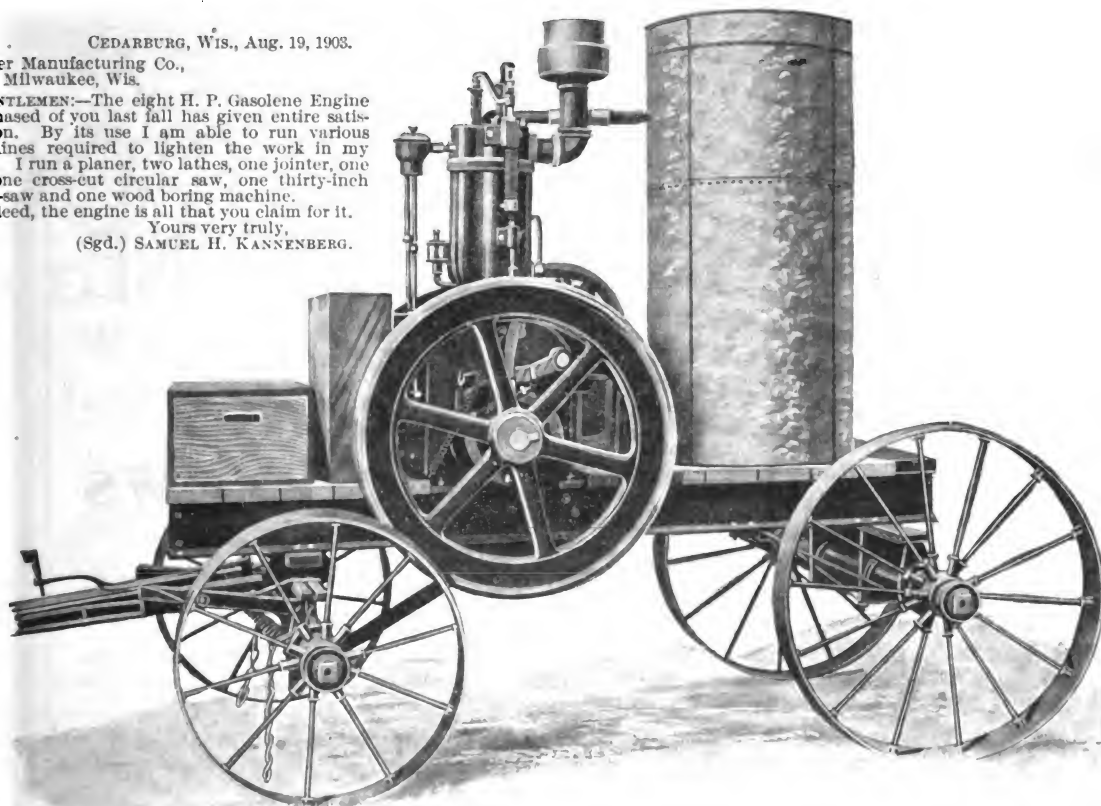
CEDARBURG, Wis., Aug. 19, 1903.

Beaver Manufacturing Co.,
Milwaukee, Wis.

GENTLEMEN:—The eight H. P. Gasoline Engine purchased of you last fall has given entire satisfaction. By its use I am able to run various machines required to lighten the work in my shop. I run a planer, two lathes, one jointer, one rip, one cross-cut circular saw, one thirty-inch band-saw and one wood boring machine.

Indeed, the engine is all that you claim for it.

Yours very truly,
(Sgd.) SAMUEL H. KANNENBERG.



Sizes 2 to 8 H. P. Vertical

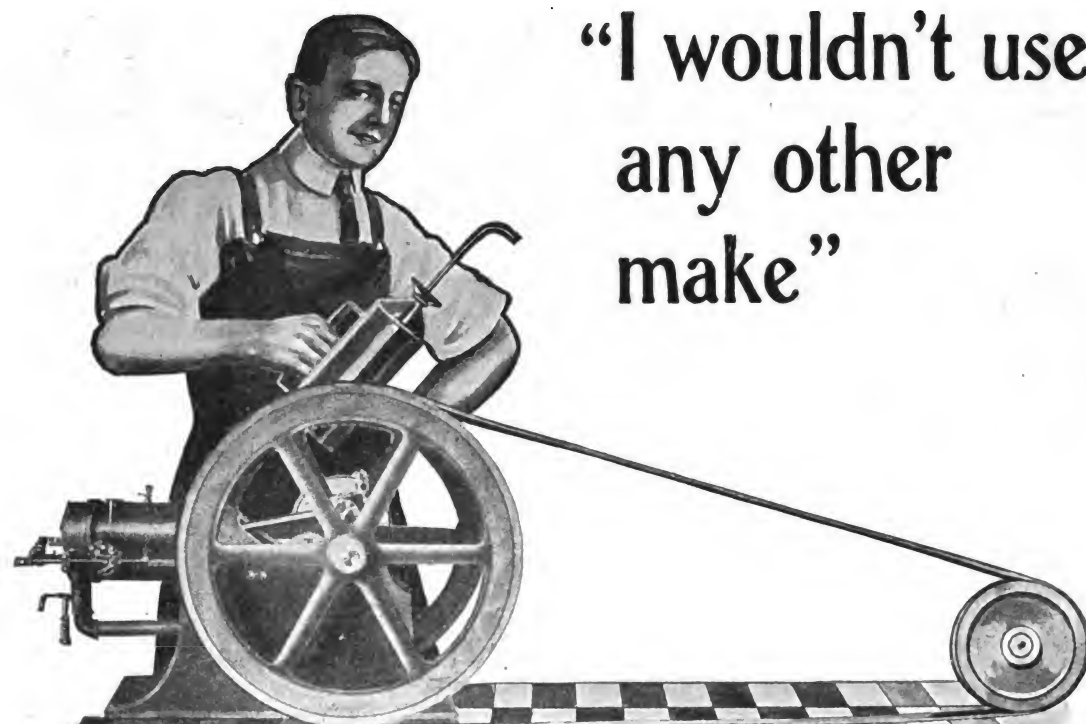
10 to 15 H. P. Horizontal

AGENTS WANTED

WRITE FOR CATALOGUE No. 15

BEAVER MANUFACTURING CO.

MILWAUKEE, WISCONSIN



"I wouldn't use
any other
make"

THE SIMPLICITY

GAS and GASOLINE ENGINE

Is preferred by blacksmiths, nine times out of ten. The man who spends his money on any other make, cuts his profit down just 50% and is continually bothered with repairs.

The "Simplicity Engine" is more easily operated, besides consuming much less gasoline than other engines, and does away with one or two extra employees in your shop.

EVERY BLACKSMITH KNOWS

at a glance the difference between careful workmanship and careless workmanship. He can quickly judge the material from which an engine is made.

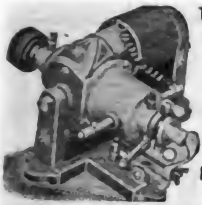
If the "Simplicity Engine" you buy isn't A No. 1 in every way, ship it back to us. We'll pay all charges.

The "Simplicity Engine" is the simplest engine made, has fewer working parts than any other four-cycle gas engine on the market, and is perfectly safe; no danger of flames coming in contact with gasoline.

Write today for our interesting catalogues and reading matter. We sell more engines to blacksmiths than any other maker in the country.

Western Malleable and Grey Iron Mfg. Co.

8-20 Chase Street - - Milwaukee, Wis.



To Owners of Gasoline Engines, Automobiles, Launches, Etc.
The Auto-Sparker
does away entirely with all starting and running batteries, their annoyance and expense. No belt—no switch—no batteries. Can be attached to any engine now using batteries. Fully guaranteed.
Write for descriptive catalogue.
MOTSINGER DEVICE MFG. CO.
33 Main St., Pendleton, Ind.

GAS AND GASOLINE ENGINES.

Stationary, Portable, Marine, Hoisting and Pumping Engines. ✕

BAUROTH BROS.,
Springfield, O., U. S. A.



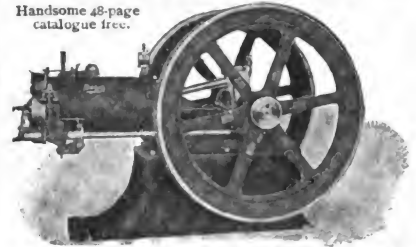
High Power at Low Cost

for fuel, quiet, smooth running, easy starting, the greatest reliability—that's what you get in

BADGER Gas and Gasoline ENGINES

Write at once for exclusive agency and prices.

Handsome 48-page catalogue free.

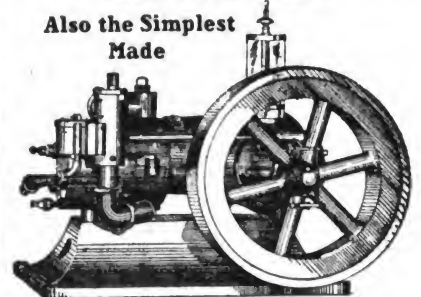


C. P. & J. LAUSON

101 W. WATER STREET, MILWAUKEE, WIS.

Most Powerful Engine for its Size Ever Built

Also the Simplest Made



3 H.P. 21 INCHES LONG 150 POUNDS

There's value in our agency. One blacksmith sold three the first month.

Get Catalogue and Particulars—Free on request.

Cushman Motor Co.
Lincoln, Nebr.

FOOL-PROOF
BECAUSE IT'S SO SIMPLE

The ELI Gasoline Engine is the **BEST** because it has no gears, cams, levers, or valve mechanism. **DON'T BE JOLLIED** into buying a complicated engine that's always out of order—get the ELI—no trouble then. Now get busy, brother, and write for booklet to-day.



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THE ELI
GASOLINE ENGINES



BAUER GASOLINE ENGINES..

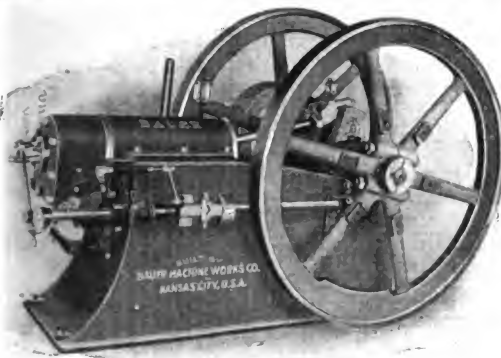
The Acme of Simplicity and Perfection.

If you will examine and compare, piece by piece, you will say there is no other quite so good as the "Bauer." All sizes from 1½ to 20 H.P. Write at once for free catalogue containing long list of letters from satisfied users. Our prices are also very interesting, considering quality.

THE FIRST BLACKSMITH in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily. The Bauer is the best.

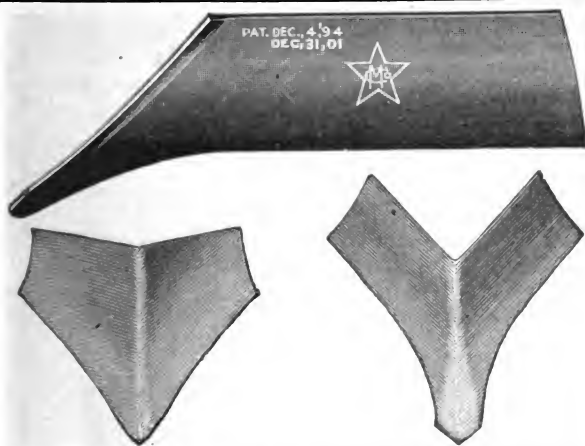
Write us Today.

Bauer Machine Works Co.
115-120 W. 18th St., KANSAS CITY, MO.

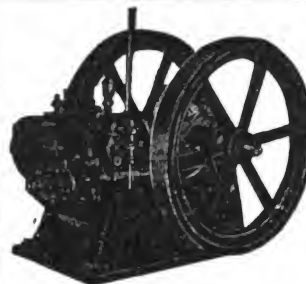


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STEEL SHAPES FOR THE BLACKSMITH
HANDLED BY JOBBERS EVERYWHERE



MADE BY
STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.



2 to 50 Horse Power
GAS AND GASOLINE



"Honest Injun," the
DEAN
Is An Honest Engine

Our new catalogue is a beauty. It tells of Gas Engines in general and Dean Engines in particular.
Write for it.

The
Dean-Waterman Co.
Covington, Ky.

Foundry: C. & O. and L. & N. Rys.

Factory: 252-254-256 Pike St.

Gas and Gasoline ENGINES

WEBER ENGINES are best because

only the very best material and workmanship go into them. They stand the test of long, severe service.

Every engine is rigidly tested before leaving the shop. Anyone can operate a Weber Engine, they require but a few minutes' attention each day.

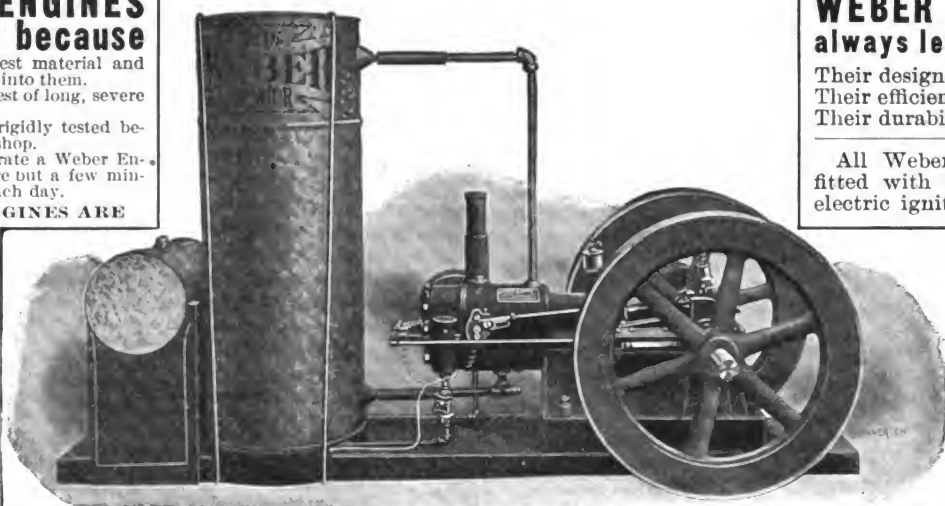
WEBER ENGINES ARE ABSOLUTELY SAFE

We build engines from $2\frac{1}{2}$ up to 300 horsepower.

Twenty years' experience is back of Weber engines.

The Weber Junior is admitted to be the most popular engine for blacksmiths.

Over 8,000 now in use making money for their owners every day.



WEBER JUNIOR $2\frac{1}{2}$ H. P. Engine. It is shipped with all attachments complete, ready to run.

WEBER ENGINES always lead because

Their design is simplest. Their efficiency highest. Their durability greatest.

All Weber Engines are fitted with both tube and electric ignitor. All crank

shafts of solid billet steel. All parts easy of access and guaranteed interchangeable.

On all Weber Engines the speed can be regulated by the operator while the engine is in motion.

FUEL CONSUMPTION

is more important than the mere price of the engine

The fuel guarantee on Weber engines is lower than that made by any other responsible manufacturer

In actual service every engine we build will use less gasoline than we guarantee by ten per cent.

GUARANTEE

All Weber engines are guaranteed to be of the very best material and the very best workmanship, and we hereby agree to replace any part found defective f.o.b. our works without cost for a period of two years. We guarantee the consumption of fuel as noted below. We guarantee the speed to be steady and uniform. We guarantee that changes in temperature will not affect the engine's running. We guarantee interchangeability of parts. We guarantee that the Weber can be operated without constant regulation of the throttle valve.

Weber Engines operate on one-tenth of one gal. of gasoline per horsepower per hour.

Brandon, Texas.

Gentlemen:—Since putting in the Weber Junior engine more than a year ago, my business has more than doubled. Have added blacksmithing and a grist mill to my woodwork shop, and am running the following machines with the engine, any two or three (excepting the mill), at the same time:

Wood lathe; 16-inch circular saw; jig or bracket saw; grindstone; drill press; blower; grist mill, grinding 10 bushels of chop an hour.

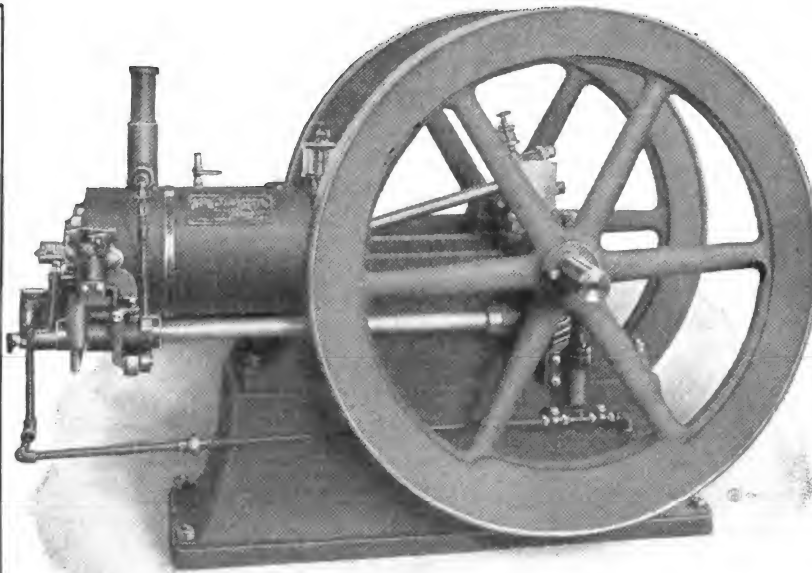
S. H. ALLRED.

Esto, Ky.

Gentlemen:—Have been waiting to give the Junior engine a trial before writing you. Have now had it in operation two months, running iron lathe, emery wheel, drill press and grindstone, and it has given entire satisfaction, is always ready when I want power and is so simple that a boy of ten years could operate it successfully. It is economical in the use of gasoline, governs perfectly, and I would not sell it at any price if I could not get another. It has created quite a sensation in this community, and all who see it praise it. I selected the Weber Jr. from among a great many others and am satisfied that I made no mistake in my choice.

Yours truly,

W. A. HELM.



Five H. P. Weber Engine for blacksmith, wagon and repair shops.

Sinking Springs, O.

To whom it may concern:—I bought a Weber Jr. gasoline engine some months ago, and it is the best value for the money I have ever obtained. I am running a band saw, machine drill, rip saw, wood lathe, iron lathe, emery stand, feed mill and corn sheller. It seems to me that this little engine must pull at least 5 H. P. I can show anyone how to operate it in two minutes. I can see that my business has increased 30 per cent. since I put in power. I have seen several makes of engines, but none to compare with the Weber as an economical power. I hardly notice the cost and can afford to start up for a five-cent job. I believe my engine will more than pay for itself for the first six months; all I regret is that I did not purchase an engine sooner. I would not try to run a shop again without power; and anyone buying a Weber will be pleased with it.

Very truly yours,

J. S. OVERHULTZ.

WEBER GAS AND GASOLINE ENGINE CO.

New York Offices, 115 Liberty St., N. Y. C.

KANSAS CITY, MO.

P. O. Box V. 1114

POWER IS WHAT YOU WANT

WE HAVE IT

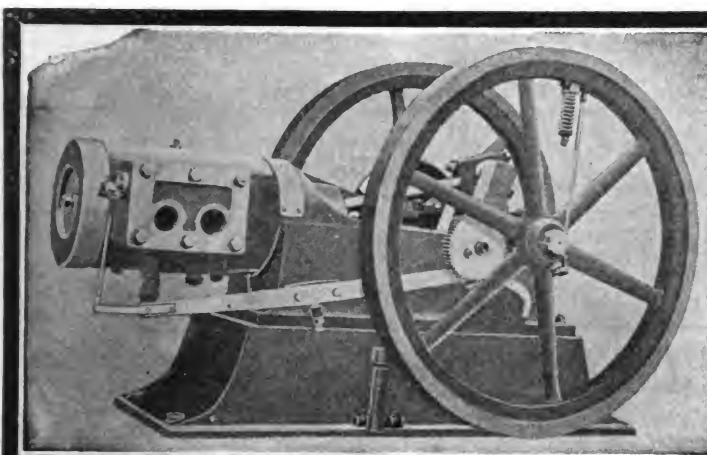
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Lathes and Drill Presses

Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

Catalogue M.

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Remy Magneto Igniter, suited for touch or jump spark ignition, with any gas or gasoline engine. They are absolutely reliable spark generators and the simplest ignition apparatus manufactured. Magneto Dynamos, Magneto Oscillators, Magneto Alternator Igniters, jump and touch spark coils, etc.

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NO BLACKSMITH SHOP COMPLETE WITHOUT POWER.

No Power so

HANDY

as a Good

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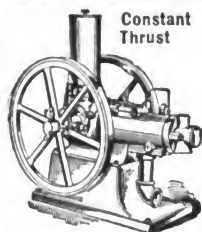
Let us send you our catalogue and quote prices. Our Specialty 1½, 2½ and 4 H.P. State your power needs. If you have a steam engine give full description

We sometimes make exchanges.

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The MIETZ & WEISS Oil and Gas Engines



Constant Thrust

STATIONARY and MARINE

1-60 H. P.

Adopted by the U.S. and Foreign Governments.

Most Economical and Safest Power known. Run with common kerosene, distillate or fuel oils.

It will pay you to consult me before placing your order elsewhere. For Pumping, Electric Lighting, Charging Storage Batteries, and all other Power Purposes. Highest award for Direct Coupled Engine and Dynamo, Paris Exposition, 1900.

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Send for Catalogue, Dep. 34.

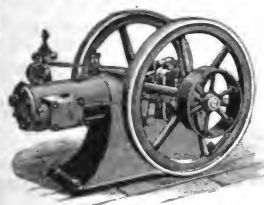
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The WATKINS

is solid, substantial and well-made; has large, phosphor bronze bearings, forged steel crank and connecting rod, has everything that a Good Gas or Gasoline Engine ought to have. Our catalogue shows all sizes and describes them in detail. Shall we send you one?

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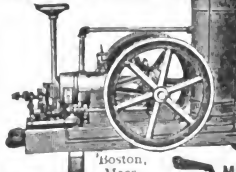
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The SIMPLEST



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Engine made. Never gets out of order. Just think, about a cent an hour per horse power. Thousands in use. 1-12 to 40 h.p. Two years' guarantee. We also carry wood working machinery, shafting, hangers and pulleys.

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Blacksmiths wanted everywhere to act as agents.



Reliable, Get-able, Durable, Economical, Beautiful.

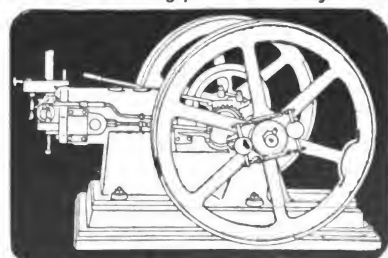
We build the most complete, closely regulated, efficient and durable engine that experience, good workmanship, good material and a thorough understanding of engine requirements can produce. We can suit you on price and quality.

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GAS OR GASOLINE

Have more strong points than any others



OUR electric Igniter can be cleaned while the engine is running. Other makes cannot be cleaned without stopping and taking the igniter out. Send for catalogue.

LENNOX MACHINE CO.

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THE MARKED SUPERIORITY OF THE

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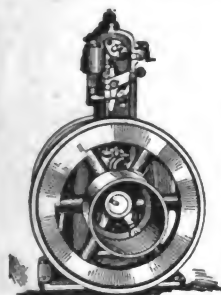
GAS AND GASOLINE ENGINES

in ease of starting and smoothness of running is readily apparent when compared side by side with the cheaper kind. While "comparisons are odious" they are sometimes helpful in arriving at the truth. See our exhibit at the World's Fair, Block 41, Machinery Hall, and draw your own conclusions.

THE OTTO GAS ENGINE WORKS

PHILADELPHIA, PA.

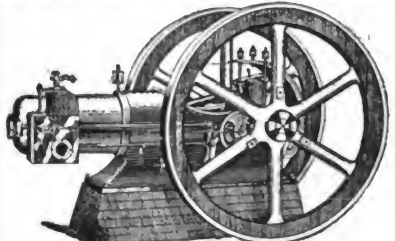
For Central New York: - - A. T. Gibson, W. Winfield.



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Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

THE TEMPLE PUMP CO., Established 1853. Meagher and 15th Streets, CHICAGO.

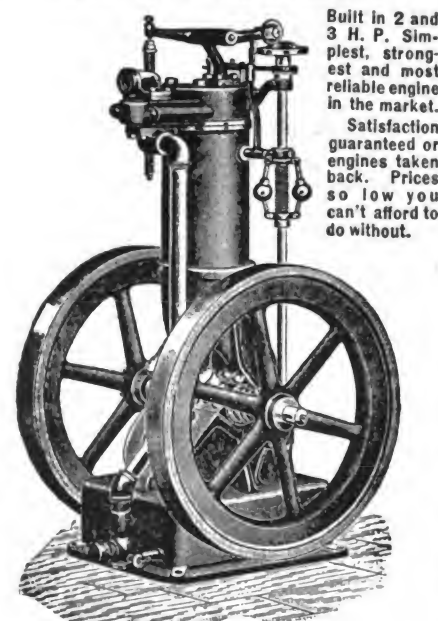


250 High-grade Engines built to use either gas or kerosene will be sold at MANUFACTURER'S COST within the next 30 days. Stationary, pumping and portable, in sizes from 2 to 100 H. P. Send for catalog and full particulars.

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Built in 2 and 3 H. P. Simplest, strongest and most reliable engine in the market. Satisfaction guaranteed or engines taken back. Prices so low you can't afford to do without.

Write for catalogue and prices.
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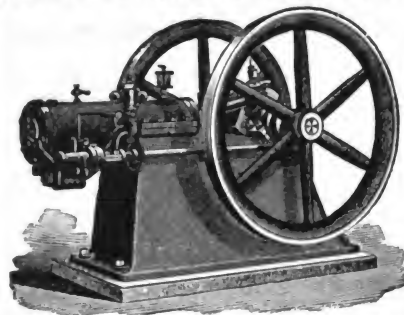
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Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.
Designed and Built for BUSINESS.
Catalogue on request.

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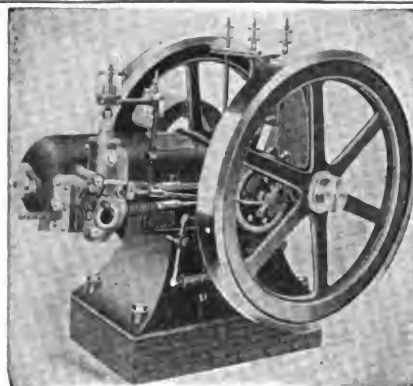
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ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33, Stating Horse Power You Need.

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NO DANGER.

Maximum power. Lightest Weight. Simple, reliable, economical. No Batteries, Self-ignition by compression. Fully Guaranteed.

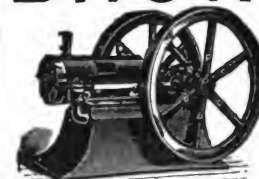
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International Power Vehicle Co.,

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1 TO 100
H. P.

COMPACT
AND
RELIABLE.

GAS AND GASOLINE ENGINES.

Simple, Economical, Durable. You need one in your business. Write for circular and prices.

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Model Gas and Gasoline Engines

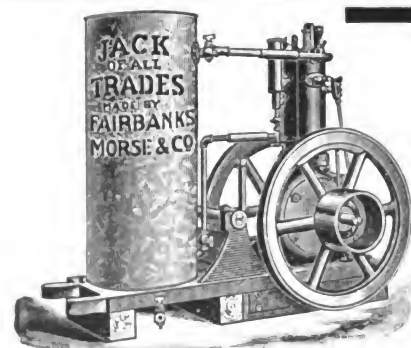
Water or Oil Cooled

The most economical and simplest engine on the market. No cylinder head packing to blow out, and with our automatic sensitive governor, absolute regularity of speed. Stationary, Portable, Horizontal, Vertical, Hoists, Pumping and Marine. Send for Catalogue No. 11.

We build the best launch engine of 8 and 6 H. P., with Reversible Bronze Propeller Wheel and Ideal Muffler.

If interested, send for circular.

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THE JACK OF ALL TRADES GASOLINE ENGINE

Develops over 2 H. P. It costs very little.

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Are best for the Blacksmith or Wheelwright

They develop more power for the money than any other. Get our catalogue and prices before purchasing elsewhere. Address nearest house.

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1 No. 2 Garvin Sprocket Miller or Lincoln Miller.
1 8-horsepower Porter Horizontal Steam Engine.
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1 Buffalo Forge Co. Blower, inlet 34 inches, outlet 28 inches square.

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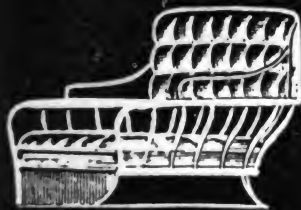
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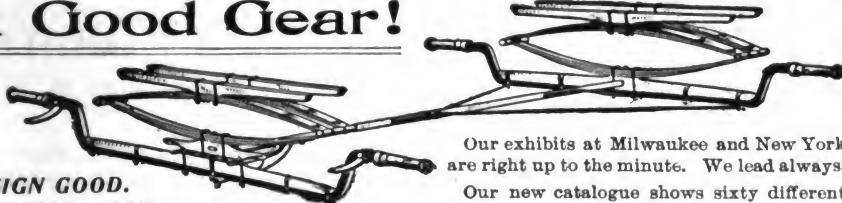
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A Good Gear!



DESIGN GOOD.
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WE ONLY MAKE THE BEST.

O. M. Milk Wagon
Gear No. 251.

Our exhibits at Milwaukee and New York are right up to the minute. We lead always.

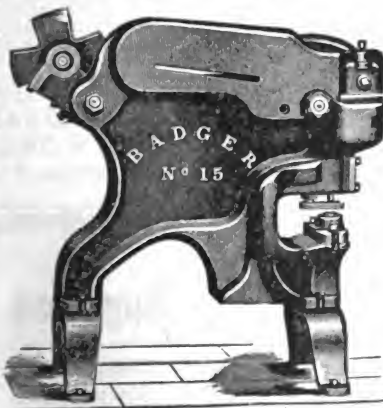
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Will shear $\frac{5}{8}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.



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Write for Catalogue and prices.

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WHAT KIND OF

CUTS

DO YOU
WISH?



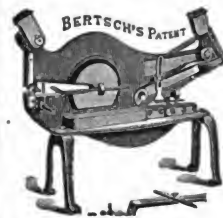
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CUTS for any purpose, and all of the highest quality.

Three-Color Half-Tones a specialty.

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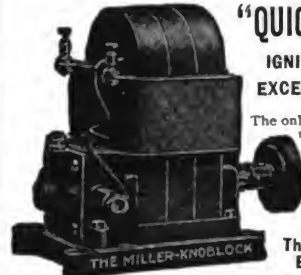
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We Manufacture
**SHEARS
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PUNCHES**

Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.

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IGNITING DYNAMOS
EXCEL ALL OTHERS!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

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Low-down
Handy
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WITH 4-IN. TIRE STEEL WHEELS



We make any size wheels to fit any skein.

WRITE TO C. BUSH,
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(MENTION THIS PAPER.)

THE GENEVA

Handy Farm Wagon

THE BEST METAL WHEEL WAGON MADE.



All Goods Guaranteed

Pressed steel wheels, any height and width tire, interchangeable hubs. Gears of selected stock, thoroughly ironed. Made in several styles.

WE ARE ESTABLISHING ONE AGENT IN EVERY TOWN.
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Geneva Metal Wheel Co.
GENEVA, OHIO

WILL YOU SURRENDER



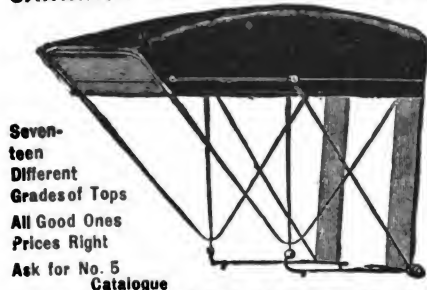
Your Farm-wagon Business to the factory made wagon? Wagon-makers everywhere regain and hold their old-time farm wagon trade by equipping their work with the **Folding Box**. It has practical time, labor and storage saving features which appeal to all classes of farmers. Requires the same wood-work and patterns to build it as are used in the old-style box. Write today for illustrated circular.

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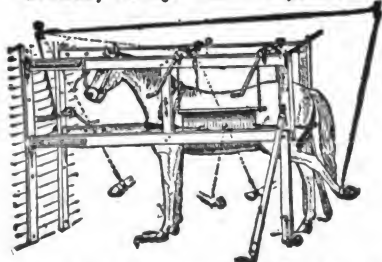


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Different
Grades of Tops
All Good Ones
Prices Right
Ask for No. 5
Catalogue

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Any blacksmith can do it and save money.
Shop right, complete plans, belt and all
necessary castings—ALL FOR \$10.00



THE ORIGINAL SCHODORF ACME SHOEING RACK
has proven the best and most practical device for shoeing bad and unruly horses ever put on the market. Simply constructed. Frames swing back against wall, where they take up no room at all. Adjusts itself to any size horse. Takes but a few moments to fasten a horse securely. No chance for injury to horse or smith. Thousands in use, each giving satisfaction. Jas. Leighton, Sylvan Grove, Kan., writes:—"I shod one of the meanest mules in Kansas in it, and it held him so tight he could do nothing but squeal. Would not take \$100 for it." Send for shop rights today. Build your own rack and you will have the best money can buy.

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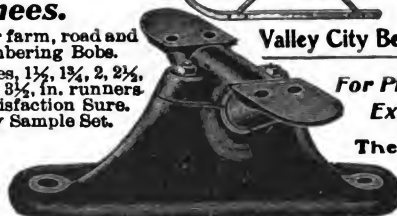
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The Shaw-Walker Co., Muskegon, Michigan

Success Oscillating Sleigh Knees.

For farm, road and
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Sizes, 1½, 1¾, 2, 2½,
3, x 8¼ in. runners.
Satisfaction Sure.
Try Sample Set.



Valley City Bent Knee Bob Sleighs

For Pleasure, Delivery,
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The Strongest,
Neatest,
and Best.

Sherwood Hall Co., Ltd., Manufacturers.

THIS is the Brown Os-
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Needs No Recommendation.
Satisfaction Guaranteed.

Sizes, 1½, 1¾, 1¾,
2, 2½, 3 and
3½.

Write us.



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Blacksmiths Can Make Money

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DR. A. C. DANIELS,
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Dear Sir:—After I had been selling Dr. Daniels' Veterinary Medicines for about nine months I wrote you saying I was well pleased with my success. Since then my sales have almost doubled, and the goods returned have decreased, only \$3.50 returned out of over \$800; a little less than ½ of 1 per cent.

I think my agency is worth more to me than a fourth-class post office, and the best of it is the people do the talking for me now.

Thanking you for your favors in the past, I am,
Respectfully,
(Signed) E. N. HOON.

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Dr. A. C. Daniels,

Largest Manufacturers of
Veterinary Medicines
in the World,



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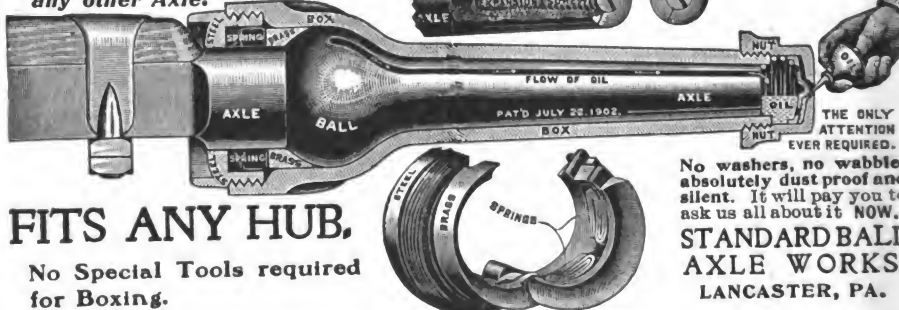
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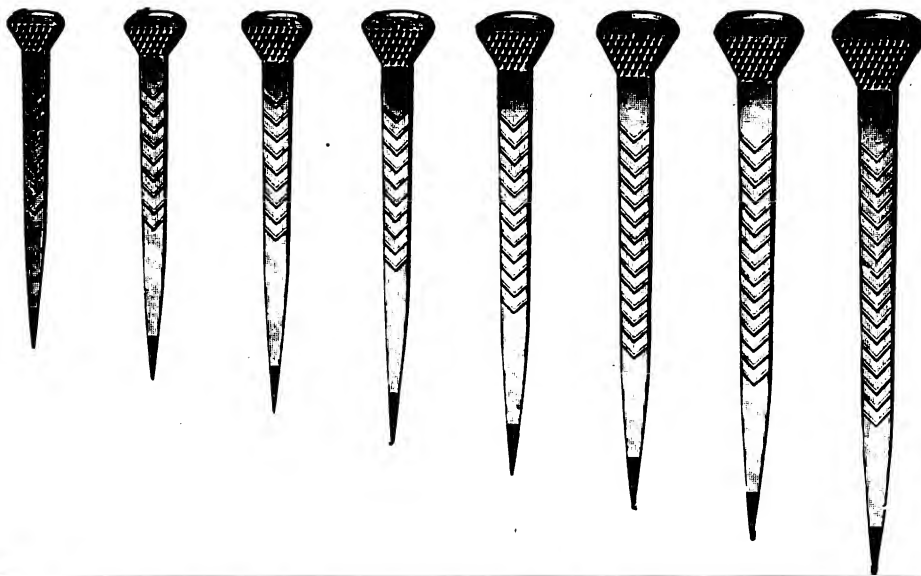
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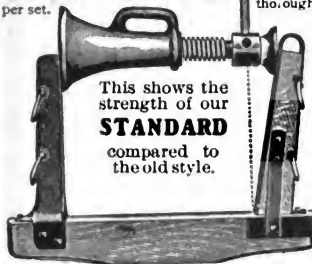
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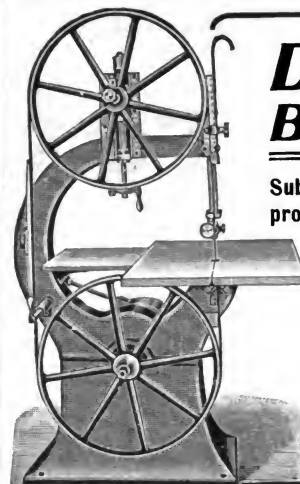
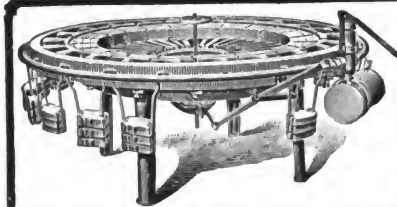
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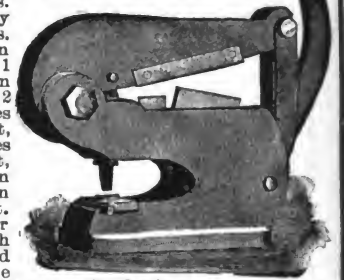
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VOLUME 4

THE

NUMBER 3

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

DECEMBER, 1904

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10⁰ A COPY



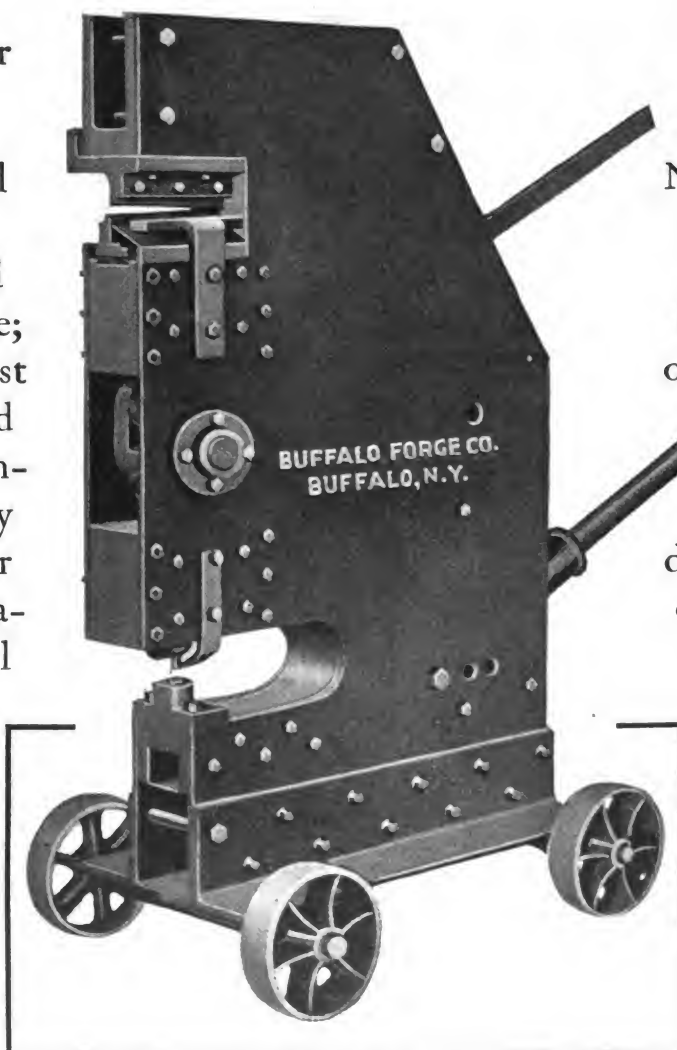
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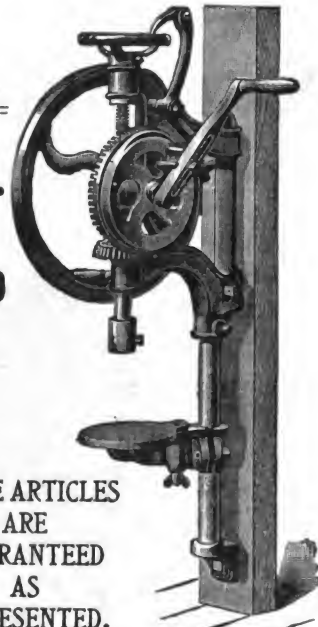


Fig. 731, No. 1.



Fig. 742, No. 12.

Special prices are extended to Carriage Makers and Smiths
if this paper is mentioned.

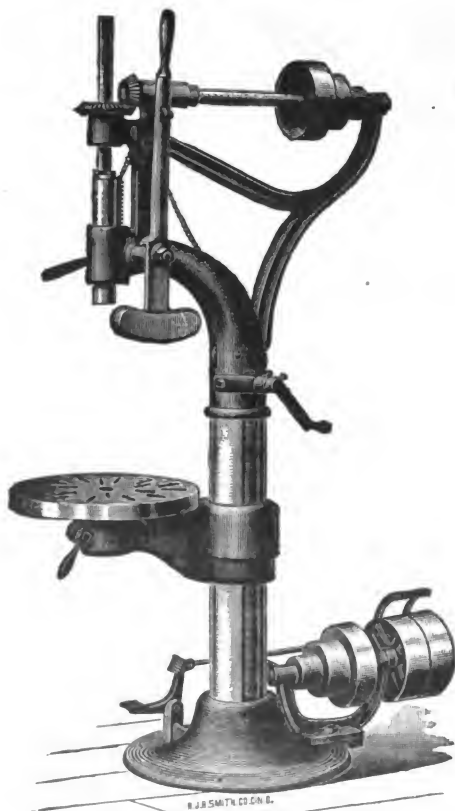


Fig. 850, 20 inch.

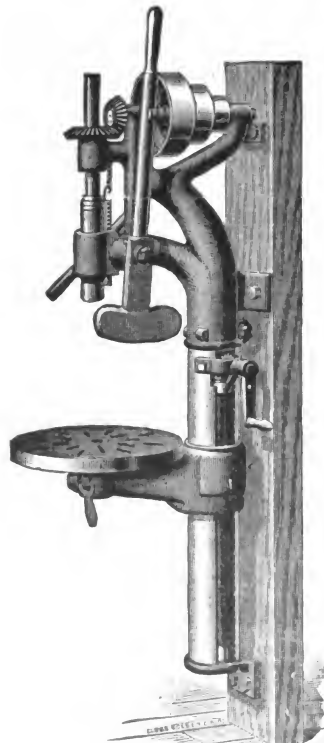


Fig. 727, 19 inch.

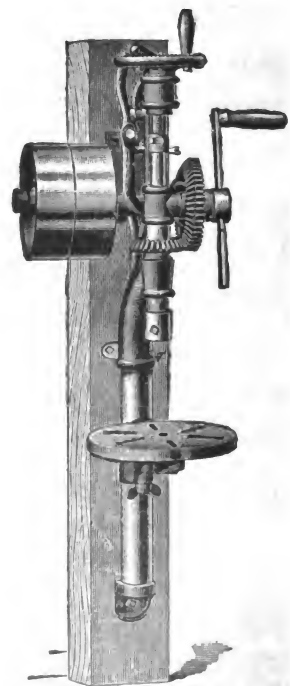
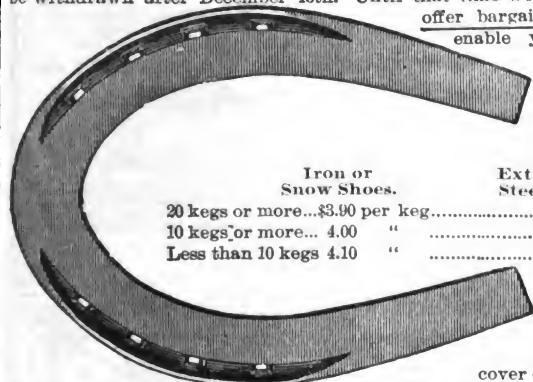


Fig. 746, No. 12.

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20 kegs or more...\$3.90 per keg.....	\$3.65 per keg.
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These special prices cover our complete

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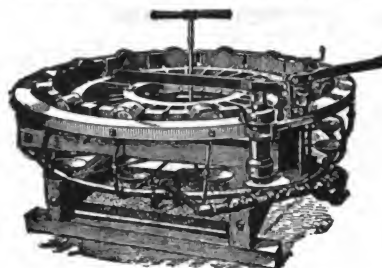
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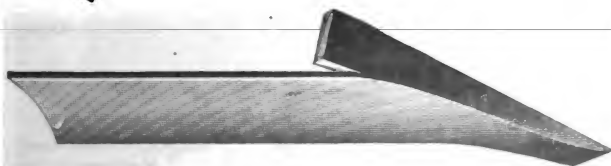
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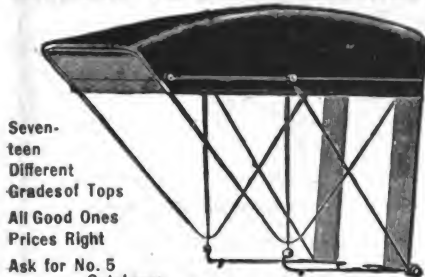
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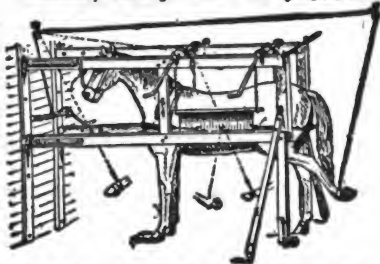


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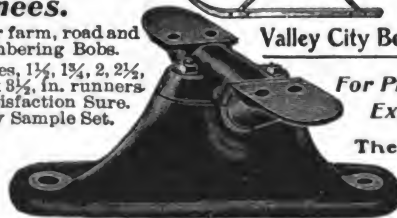
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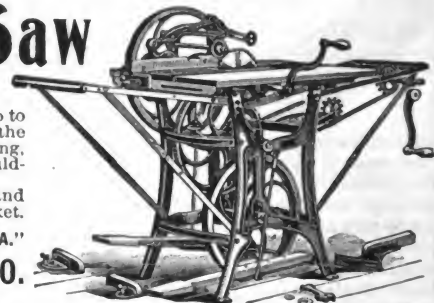
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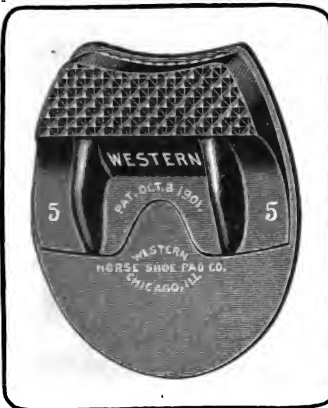
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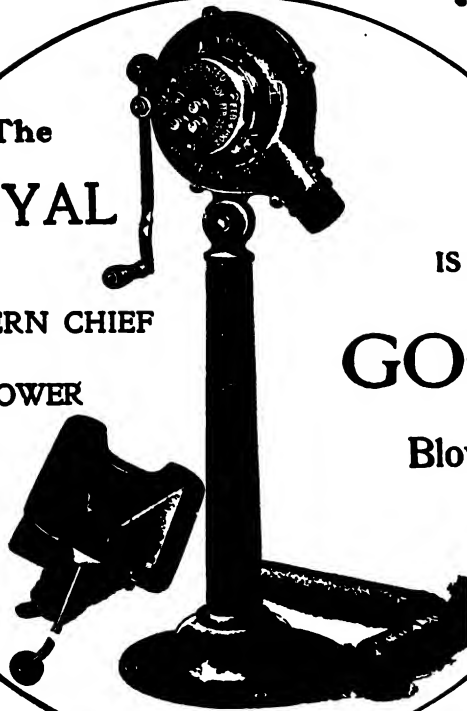
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BLOWER

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GOOD
Blower



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Its operation is easy and noiseless.
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No spiral or worm gears.
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Fire-pot measures 9x11½x4 in. inside.

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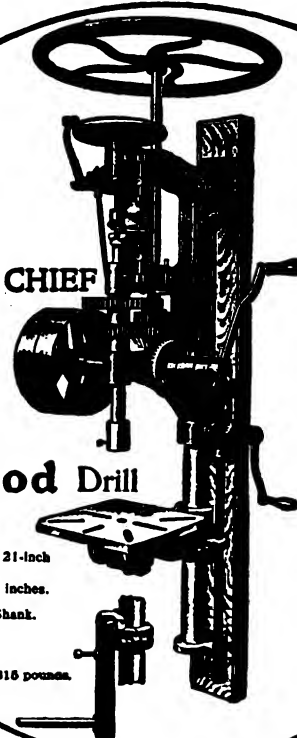
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Seems to have brains.

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WESTERN CHIEF
DRILL

No. 14
Is a Good Drill

Drills to center of 21-inch Circle.
Bores from 0 to 1½ inches.
Takes Bits ½ or ¾ Shank.

Weight, 815 pounds.



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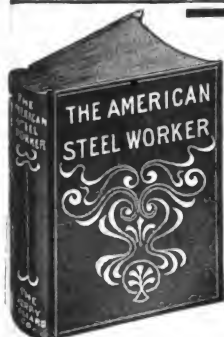


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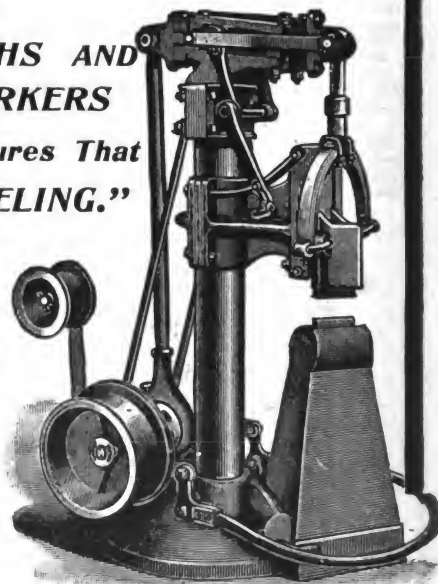
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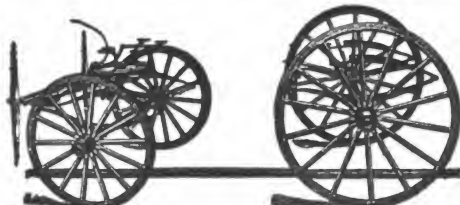


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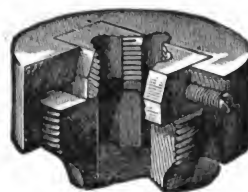
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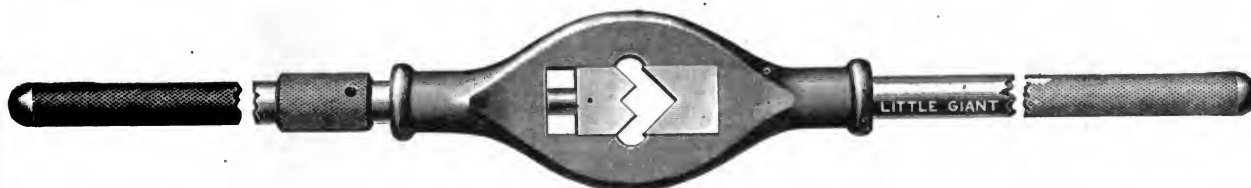
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Are acknowledged by American mechanics everywhere to be excelled by none. Their uniformly **high quality** is shown by the accuracy of the work they do.

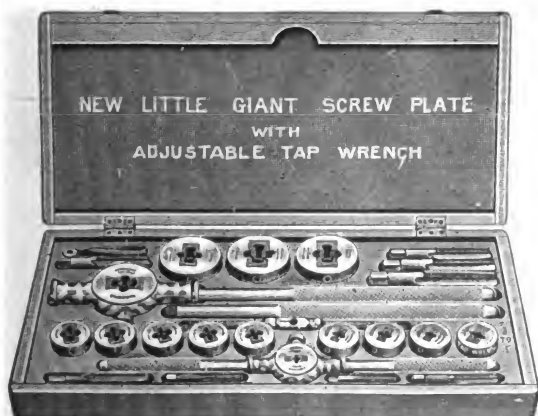
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of **HAHN** rubber horseshoes are being used daily all over the country. All who have put them to a practical test have voted them a marvel of utility and merit.

They are equally suitable for light carriage horses as well as heavy dray horses, and some of the leading racing, livery and private stables have adopted this shoe for regular use. Federal and municipal departments, express, freight and transfer companies, fire, police and ambulance departments, cab, coach and street car companies, besides the cavalry and artillery departments of the army, find the **HAHN** rubber horseshoe to **Give Entire Satisfaction**, as this shoe enables the horse to "keep his feet" in all kinds of weather.



THE HAHN

horseshoe is the embodiment of a humane principle. It is lighter on the animal's feet than an ordinary shoe. It gives the horse confidence in its movements. It allows of a perfect fit, which is impossible in the ordinary rubber shoes.

It is the ideal horseshoe, no matter what the weight of the animal, the condition of the roads or the nature of the work. It means good luck to not only the horse, but the owner of the animal also.

THE HAHN

horseshoe prevents the horse from slipping or stumbling on ice, stone or asphalt. It prevents sudden jar and concussion. It gives the animal a soft tread such as was intended by nature. It makes the horse sure of his foot-hold at all times. It deadens the sound of the horse's hoofs. It saves veterinary surgeons' fees for the owner. It prevents lameness.

It is unexcelled by any other shoe on the market.

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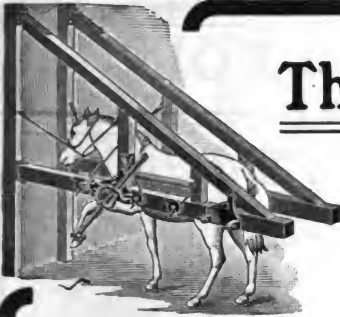
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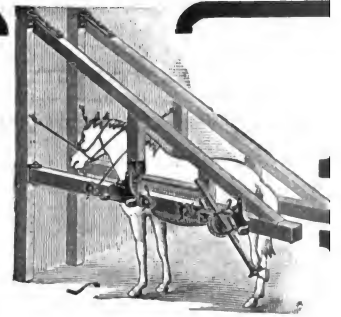


The Pictures Tell the Story



As these illustrations show, Barcus Stocks are strong and solid. They have no ropes and pulleys to tangle and break, and no cumbersome bracing to roof or floor. The frames swing back out of the way when not in use. The leg arm can be changed

quickly to any position convenient for working, and can be shifted from hind to fore foot, either side, in thirty seconds. Perfect and rapid ease of adjustment is but one of the many strong points of the Barcus Stocks.



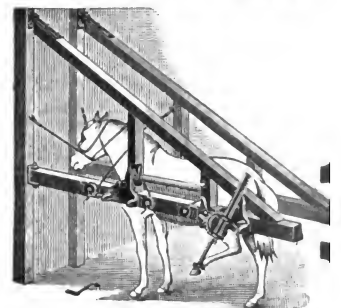
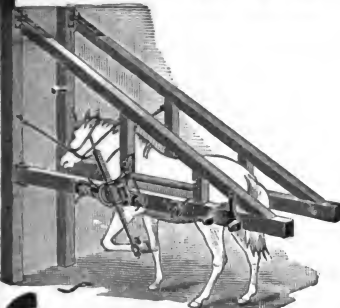
BARCUS STOCKS

ARE THE BEST

They are the best because they are the only ones absolutely guaranteed to hold any horse perfectly without danger to either horse or man. Because there is no danger of getting hurt while fastening a rope or strap around a horse's foot, as with other makes of stocks. Because you can place any foot in any position instantly. Because guaranteed not to chafe the foot.

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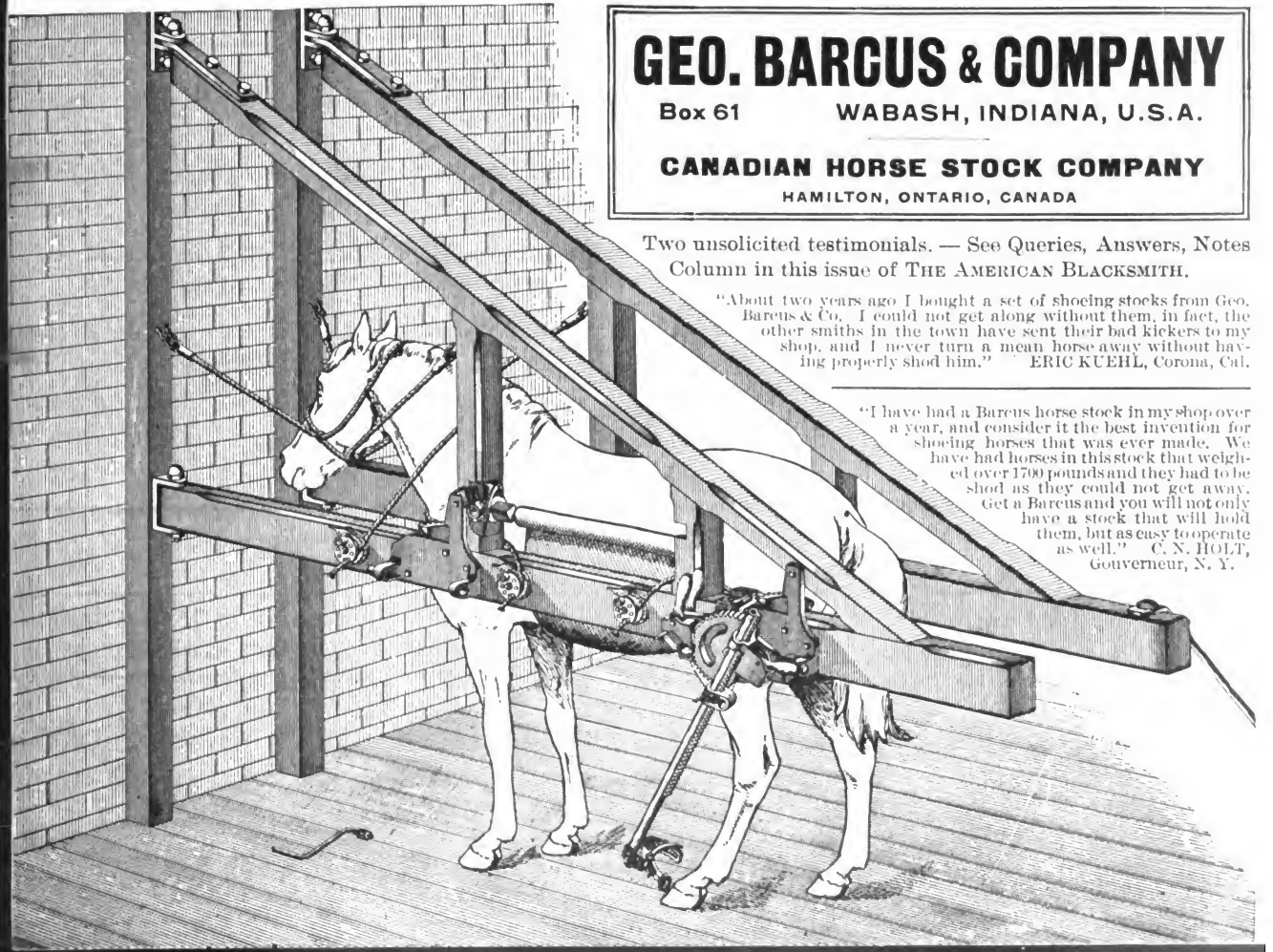
CANADIAN HORSE STOCK COMPANY

HAMILTON, ONTARIO, CANADA

Two unsolicited testimonials. — See Queries, Answers, Notes Column in this issue of THE AMERICAN BLACKSMITH.

"About two years ago I bought a set of shoeing stocks from Geo. Barcus & Co. I could not get along without them, in fact, the other smiths in the town have sent their bad kickers to my shop, and I never turn a mean horse away without having properly shod him." ERIC KUEHL, Corona, Cal.

"I have had a Barcus horse stock in my shop over a year, and consider it the best invention for shoeing horses that was ever made. We have had horses in this stock that weighed over 1700 pounds and they had to be shod as they could not get away. Get a Barcus and you will not only have a stock that will hold them, but as easy to operate as well." C. N. HOLT, Gouverneur, N. Y.



With the First BUFFALO No. 604 FORGE

Sold in Each County We Give

A Buffalo Drill FREE

OUR AD in the November American Blacksmith, offering a No. 66 or No. 68 Buffalo Drill free, until December 1st, with the first No. 604 Buffalo Forge sold in each county has brought hundreds of letters from blacksmiths everywhere, who are eager to take advantage of this splendid offer while it lasts. Many ask us to extend it another month.

Hence, for thirty days more, or until January 1st, 1905, we have decided to keep this unusual offer open. To the first blacksmith in every County in each State and Territory of the United States, who orders a Buffalo No. 604 Forge, **we will give one of our fine No. 66 or No. 68 Buffalo Blacksmith Drills ABSOLUTELY FREE.** Only one smith in each county—the one whose order reaches us first—gets the drill free. The price of these drills is \$10 each. If one blacksmith in each of the 2,816 counties in the United States accepts this offer, we shall have to give away \$28,160 worth of drills. Do you ask why we do this? We can afford to offer this inducement, because each Buffalo No. 604 Forge thus sold is sure to bring in orders for others. One of these forges in each county would be the finest advertisement possible. Every black-

smith who gets a Buffalo No. 604 Forge will praise it so that his brother smith will buy one. Take this advertisement to your dealer, and he will fill your order; or you can buy direct from us. Read the opposite page carefully. Make yourself a Christmas present of a Buffalo No. 604 Forge, and we will make you a Christmas present of a drill.

If You Want a Drill Free You Must Order of Your Dealer or Mail Your Order to Us Before January 1st, 1905.

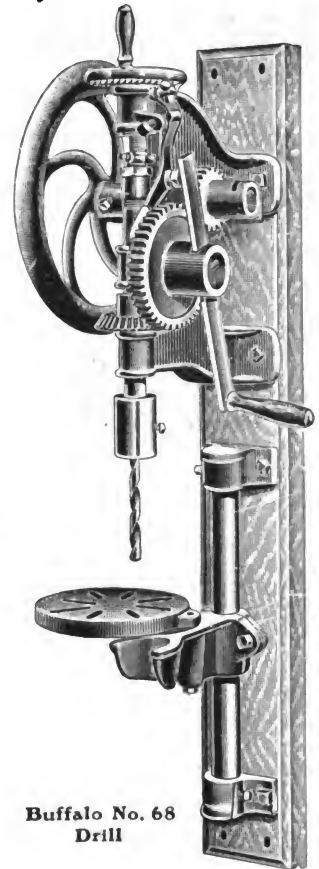
Buffalo Blacksmith Drills, Nos. 66 and 68, are high-grade machines. Cut gears are employed. All shafts and screws are of fine steel, and the bearings reamed to standard gauges. They are made for hard work, are easy to operate and very durable. The two drills are just the same, except that No. 66 has an iron back and No. 68 a wooden back, as shown. The design is careful, the workmanship the very best. Both have automatic feed attachments, and will drill holes up to one inch in diameter in the center of fifteen-inch circle. The feed has a run of three and one-fourth inches. **If you bought one of these drills from us or your dealer you would have to pay \$10 for it.** We now offer you

Your Choice of Either Drill Free -- See Above.

Have you our handsome new catalogue of forges, blowers, drills and blacksmith tools? Drop us a postal for it.

BUFFALO FORGE COMPANY

Buffalo, N. Y., U. S. A.



Buffalo No. 68
Drill



Buffalo
No. 66
Drill

BUFFALO ^{No.} 604 FORGE

SPECIAL OFFER

THIS MACHINE has the very latest improvements, the most careful design, the highest grade of materials and workmanship, as well as our twenty-seven years' experience and our complete guarantee back of it.

By all smiths who have seen and used it, the Buffalo Forge No. 604 is declared to be the finest forge for general blacksmith use ever built. It is strong, rigid, compact and unbreakable. No other forges made have such high power, large capacity and rapid heating qualities. The fire-pan, tuyere, coal and water boxes are new in design and thoroughly up to date.

Each machine is sold subject to satisfactory test before paying for it.

Your dealer will fill your order for one of them on this trial basis.

Attached to this forge is the high power No. 200 Buffalo Blower. It works easier, will not wear out, requires less attention, and gives a stronger blast than any other blower ever made. Durability, strong blast and easy running are its strong points. Its design is simple. Nothing but the finest material and the most superior workmanship enter into its construction.



THIS GUARANTEE goes with each machine:

We will replace without charge any repairs, caused by wear, for five years. We guarantee this blower to outwear any other on the market. We guarantee it to produce a stronger blast with the same number of turns of the crank per minute, and with less power than any other hand blower built.

The Buffalo No. 604 Forge, as illustrated and described on this page, is by all odds the finest machine of the kind ever introduced. **Now** is the time to get one. Read the remarkable offer made on the page opposite. If you are the first smith in your county to order one of these

forges before January 1st, we give you a splendid blacksmith's drill free. The price of this forge is not advanced because of this special offer. Read these two pages over carefully. Act promptly.

Buffalo Forge Company, Buffalo, N. Y.

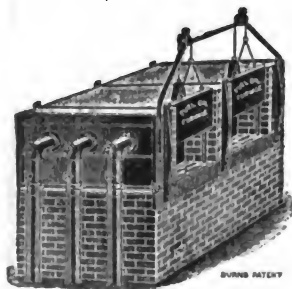
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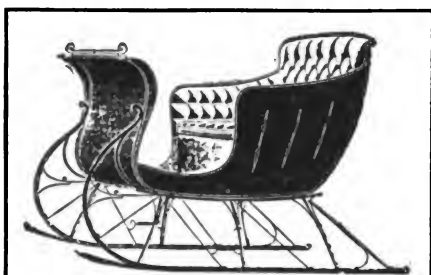
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LOW PRESSURE FAN BLOWER SYSTEM



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FORT PLAIN
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Are specially adapted for your trade. From Wheels to Runners in 5 minutes. These runners fit on the axle in place of the wheels. Built for all vehicles. All iron and steel, indestructible.



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Adjustable to any track.

Get our catalogue and prices. It will pay you.

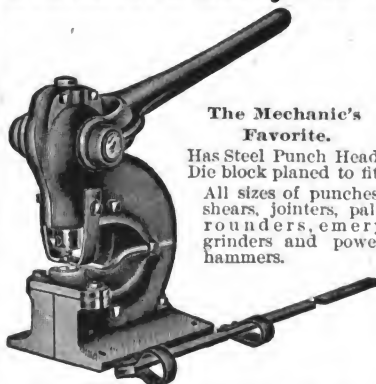
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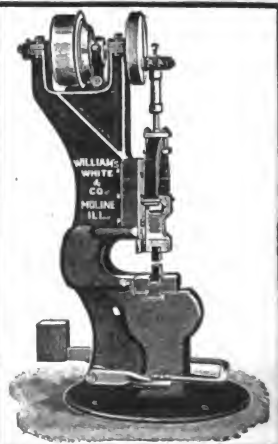
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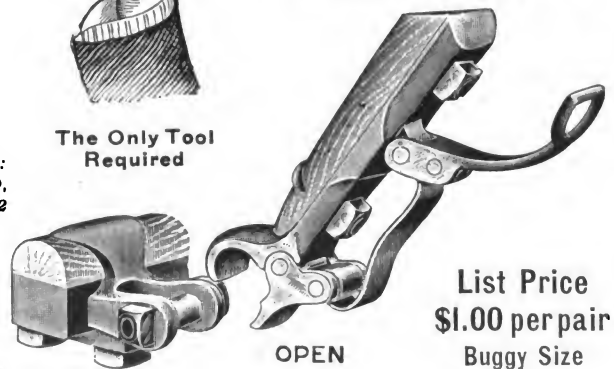
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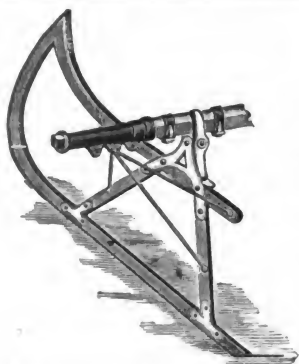
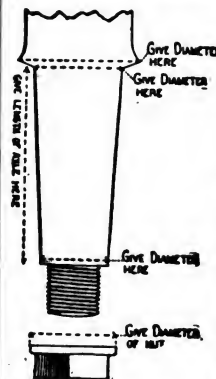
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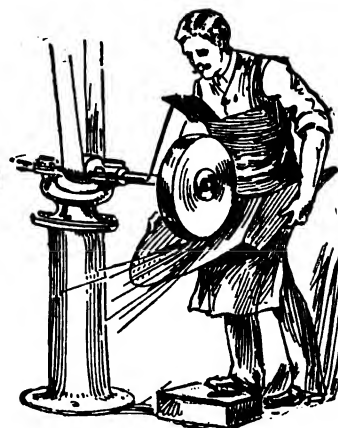
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THE AMERICAN BLACKSMITH

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Have You Sent In That New Name?

The request lately made to the readers of THE AMERICAN BLACKSMITH that they each secure a new reader for the paper before January 1st, has met with a ready response, and a great number of our friends have had their subscriptions extended for six months or a year by securing for us one or two new readers. We desire to add as many new names as possible to our subscription lists before January 1st. If you have not already sent in a new name, will you not remember to do so before that date, so as to take advantage of our offer and get your subscription extended? Six months' credit, you know, for the name of every new reader that you send in to us.

Do you think the boy would like a chance to earn some Christmas money? If he would, let him write to us and we will put him in the way of securing some extra pocket money at this time.

The Gas Engine as a Helper.

The numerous advertisements for blacksmith shop helpers which are constantly appearing in the daily and trade papers, together with the many inquiries in other ways for competent

helpers, are indications of a growing scarcity of men to fill these positions. We often hear of smiths who need a good helper and who advertise and seek one vainly for many months at a time. The fact is that the blacksmithing and horseshoeing craft offers but little inducement to able-bodied young men, and as a result far too few are learning the trade. In many sections jealousy and price-cutting makes it hard for even first-class craftsmen to obtain more than a bare living for themselves and their families, which state of affairs is not much of an encouragement for young men to take up the hard work of blacksmithing.

As a solution for this much-to-be-regretted state of affairs, it is urged that the members of the craft in their respective neighborhoods unite for their mutual benefit and raise the prices to a proper level. Such a reform would undoubtedly attract beginners to the field, but a movement for better prices of this kind would not immediately increase the number of smith-shop helpers available, so that a man who urgently needs someone in his shop to share the burden of the work, must look for some other solution of his problem.

Many craftsmen have already pointed a way out of the difficulty. Failing to secure human help, they have employed the services of a mechanical helper, or in other words, have installed an engine or some other form of power in their shop to take the burden of work from their shoulders. It is surprising to know how far a gas engine, for instance, will take the place of a helper, and in fact many blacksmiths who have had experience with engines go so far as to say that they prefer an engine to a man.

Any smith can easily figure out how long it would be before the wages which he would otherwise pay a helper would buy an engine and enough power-driven machinery to enable him to do more and heavier work than two men unaided could accomplish. Once the machines are paid for, the wages which before went to the helper are clear gain for the

smith. Again, an engine of reliable make never strikes or demands more pay. Neither does it grumble at working overtime, and when work is slack it charges its owner nothing lying by.

These are some of the considerations which have prompted so many shop-running craftsmen to install power in their shops, and there are few blacksmiths and wagon makers today who can not ask themselves whether power would prove profitable for them also. An engine may end the difficulty of smiths who are unable to procure help; in localities where help is plentiful it permits a much larger and heavier line of work to be done.

The Horseshoe as an Emblem of Good Luck.

The idea that the horseshoe is a symbol of good fortune, or as it is termed, will "bring good luck," is firmly rooted in the popular mind, but how many of us have stopped to inquire what might have been the origin of this superstitious regard with which they are held. When one comes to look into the matter, it is surprising to find that the origin of the belief in horseshoe luck is very ancient, as well as the fact that the belief is current in many different parts of the world.

Ever since horses began to wear shoes, those crescents of iron have been accounted lucky emblems of all people and nations that have been acquainted with their use, says a contemporary.

The Chinese, for instance, say they nail them up over their doors as a charm against evil spirits, because of the close resemblance in shape between them and the arched body of the sacred snake, Nagandra, one of the principal deities that they worship.

Ask a Turkish Mahomedan for information on the subject and he will tell you that it is because they are formed like a crescent, which is the sacred emblem of Islam.

A Polish Jew will explain that at the Passover the blood sprinkled upon the lintel and doorposts, in the manner

directed by their ritual, forms the chief points of an arch; hence, obviously, the value of arch-shaped talismans such as horseshoes are.

The stolid and unimaginative Russian peasant, on the other hand, maintains that the luck associated with the horseshoe is chiefly due to the metal irrespec-

still, three horseshoes—had been affixed, prongs downward.

The origin of this particular belief is referable to the old legend of St. Dunstan. This versatile English ecclesiastic was a skilled farrier, and one day while at work in his forge the evil one entered in disguise and requested Dunstan to shoe his "single hoof." The saint, although he at once recognized his malign customer, acceded, but caused him so much pain during the operation that Satan begged him to desist. This Dunstan did, but only after he had made the evil one promise that neither he nor any of the lesser spirits, his servants, would ever molest the inmates of a house where a horseshoe was displayed.

The Craft Outlook in Canada.

GEORGE NABLO.

In Canada there has of late years been a great falling off in those who are to take the place of the older blacksmiths. Those who are still hammering away are sorely taxed to do the needed repair work for the farmers. Added to this is the scarcity of help, as no journeymen can be gotten. I know at this moment at least a half dozen retired blacksmiths who have taken up other occupations, who would still be useful in the shop, but they don't care for it any more. The cause seems to be chiefly this: The young men of today have too many avenues of business to select from, and they don't care to spend the necessary three years as an apprentice in a blacksmith shop. They prefer becoming "counter-hoppers," machinists, doctors, lawyers, electricians or employees in some factory where they can get good wages at once and have some money to spend. I can recall the time when no country shop was complete without its apprentice, but a man can now travel a long way before he meets with one.

What will be the outcome of this? A scarcity of country smiths, and for those who remain, excellent opportunities for a lucrative business. Now the work of a country smith has many bright sides. It requires some hard work sometimes and a good deal of ingenuity to meet the many calls of customers, but then they are well paid, have and own their own homes, and are busy the whole year. Take the house carpenter, the mason and the house-painter; they are busy during the summer season and in the winter they are mostly idle or have to do odd jobs to earn a living. Blacksmithing is and has always been regarded as a most honorable vocation, and with the modern appliances, which go far to lighten the

hard work, it should be more sought by the young man than it is. It is true that the building of vehicles, which was once entirely in the hands of the country mechanic, has been absorbed by manufacturing concerns, and hardware stores supply many things in the shape of malleables that smiths had to make formerly, but the farmers need a great deal more in the line of implements to carry on their work and these have to be repaired. The wagons, carriages and carts are brought to the shop to be repaired. The plows, harrows, discs and cultivators have to be kept in order, and even the threshing engines need frequent repairing. And then, horseshoeing, who is to do that? The country smith, of course. It's his own fault if he is not well paid, for if a community objects to paying decently for the smith's services he can soon find one where they do. So I would say in conclusion, that the sturdy young man makes a mistake in refusing to learn a vocation that has so many advantages over those now sought by the majority.

A Remarkable Mental Feat of a Young Smith.

The following story is told of Elihu Burritt, who, as a young man, it will be observed from the narrative, made the most of his time and opportunities, and whose efforts prepared him for just such triumphs as the one cited here.

A number of years ago, a vessel,



UTILITY AND ORNAMENT COMBINED, IN CHURCH-DOOR IRON WORK.

tive of its shape, iron being traditionally a charm wherewith to nullify the malevolent designs of evil spirits and goblins.

Very different is the story by which the Irishman seeks to account for his liking for the same talismanic symbol. The name "Ironclad" or "Ireland," he will tell you, originated as follows:

The whole island was once submerged in the sea, out of which it rose only once in seven years, and then only for a short time. Many attempts had been made to break the spell and induce the country to remain permanently above the waters, but all were vain until one day a daring adventurer threw a horseshoe from a boat on the top-most peak of Wicklow Mountains, just as they were disappearing beneath the waves. Then, at last, was the ban removed. The Emerald Isle began forthwith to rise again from the ocean depths, into which it had sunk. And it has been dry land—more or less—ever since that time.

In England, up to comparatively recent times, horseshoes were extensively used almost everywhere as anti-witch charms, and the custom is not even yet an extinct one. No witch, it used to be said, could enter a building over the door of which a horseshoe—or, better



AN ARTISTIC GATE AND LAMP.

while on a trip through the South Seas, was wrecked on one of the islands. An account of the disaster was written in the language of the islanders, but as no one could translate it, the owners were unable to get insurance. Even

the professors at Yale and Harvard were confronted with the paper, but they said translation was impossible. The owners had all but given up hope of ever recovering their insurance, when they heard of Burritt—a young man who was educating himself and who thought he could translate what the college professors could not. So the ship owners, little thinking of his succeeding, placed the paper in Burritt's hands. The young smith set to work in dead earnest. Though unacquainted with the dialect of the islanders he worked on the paper until he solved the problem, and the ship owners got their insurance.

Here was a young fellow who had been working at the forge day after day, shoeing horses, repairing wagons and doing the hard work of a general blacksmith, studying only in his spare time and on holidays, but who succeeded in a task which the learned professors of the land thought impossible.

Why did he succeed when the others failed? Because, when employed at any task he worked at it as though it was his only opportunity, as though his life depended upon its successful accomplishment. He labored on the basis that any piece of work set before him might be the means of bringing him to a higher place. He made every occasion a great occasion.

Examples of Buffalo Ornamental Iron Work.

The three engravings shown here are specimens of some of the artistic iron work to be seen in Buffalo. Unfortunately, we were unable to secure the names of the firms who turned out the specimens, but some good ideas can be obtained from them when designing wrought iron work.

One of the views, it will be seen, is of a church door, which is at the side entrance of one of Buffalo's most beautiful churches. The other two views show artistic arrangements of scrolls in combination with straight line work.

The Gas Engine.—4.

E. W. LONGANECKER.

Common Troubles in Operating.

Failure to ignite the charge in the gas engine is perhaps the most common trouble the gas engine operator has to contend with. It may be due to a

variety of causes. But as electric ignition is practically the only method now in use, we will consider it first. The electric spark which ignites the charges depends for its igniting qualities on a good, reliable generator of the electric fluid or current. This generator may be a battery, fluid, dry or storage. If the latter, it can not properly be called a generator because the electrical energy is simply stored there from some other generator, and is given off when a circuit is made until all the stored energy is exhausted, when it must be stored

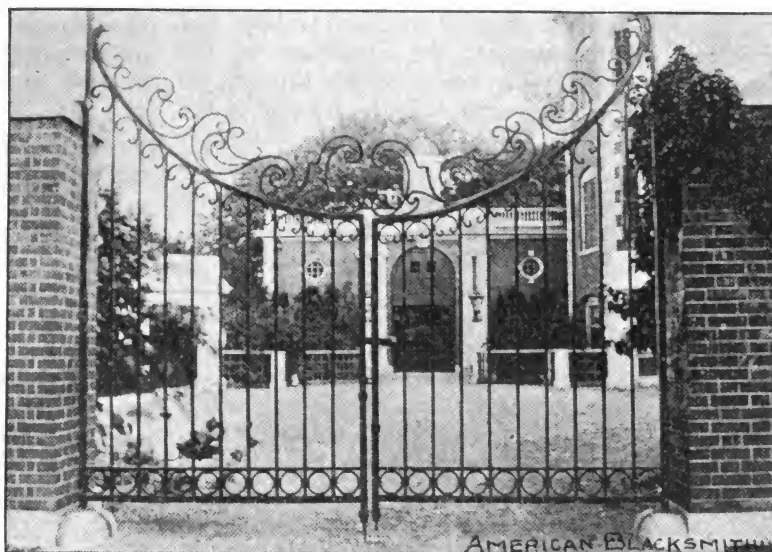
When an engine does not fire all its charges we usually consider and test the strength of the generator. If a fluid cell or battery, we lift up the lid of the cells and see if any of the zinc plates are nearly or entirely consumed. If you find any of them entirely used up you may be sure that your battery elements need renewing.

A dry battery is tested by putting a set of new cells into the circuit; and if the engine runs from the new cells after the old ones are cut out, you may conclude that the old cells are exhausted

and should be thrown aside. The dynamo may be tested for a good current by using a foot or two of insulated wire. Strip the ends of their insulation and apply as follows while dynamo is running at full speed: Hold one end of the wire onto one of the binding posts on the dynamo and snap the other end off the other binding post. A bright spark will be seen where the wire slips off the binding post if the generator is doing its work properly. It is always desirable to have a good spark coil in the

circuit between the battery and the engine to obtain good results.

It is necessary for every operator to be able to test the current his generator produces when his engine shows lack of energy. If the engine does not fire every charge it takes, something is wrong and it needs immediate attention. If a battery is used, the want of ignition or irregular ignition may be due to an exhausted condition of the battery. Its strength for generating purposes is exhausted. And if it is a fluid battery, the old zinc, carbon and solution must be renewed; or if the zinc plates have not corroded much, the solution should have fresh rain water added to it until it stands from three-fourths to one-half an inch from the lid on the cell. This should be done to every cell that does not seem full enough. Fluid batteries frequently lose strength because the solution evaporates to a point where the top of the carbon plate is hardly covered with the solution. The top of the carbon should be at least one inch below the surface of the fluid to insure the best action. The safest plan is to keep the solution up to within about

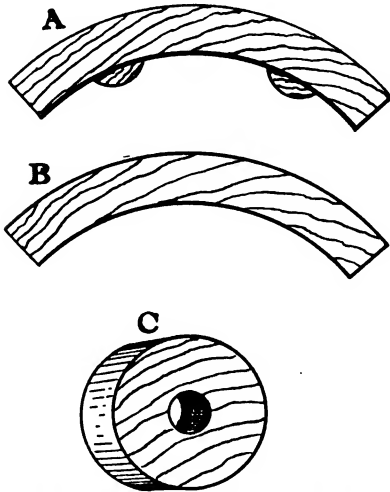


A SIMPLE BUT VERY EFFECTIVE DOUBLE GATE.

again before it can be of further service. The fluid or dry battery may be called chemical generators of electrical energy. The elements used within the cell so act upon each other that when a circuit is made a current of electricity passes from the battery over the circuit conductors, which are usually a pair of insulated wires passing between the engine and the batteries. The mechanical generators used for this purpose are usually known as dynamos or magnetos. They are sometimes used alternately with a battery, the latter being used for starting the engine until it attains its full speed, when the dynamo generates a current and the circuit from the battery is then broken and closed with the dynamo, the current from which, flows to the engine to make the igniting spark. Consequently one must familiarize himself with the style of generator used in connection with his engine. The source of the electrical current is quite often at fault. The dynamo or battery does not produce sufficient electrical energy to make a constant succession of igniting sparks. And the result is irregular ignition, if at all.

one-half inch of the lid. If good paraffine oil is used on top of the fluid but little evaporation occurs; and if the cells are properly filled when first set up, with paraffine oil on top of the solution, no further attention is necessary until the battery is exhausted. But when ignition becomes irregular or ceases, the lid of each cell should be lifted high enough out of the solution so that the zinc plates may be examined as well as the height of the solution within the cell.

So much for the source of the electrical current. No one should conclude



ON USING A WOOD-WORKING SHAPER.

that this is the only point of trouble in electric ignition; in fact, the conductors or carriers of the current from its source to the engine, or to the igniting point are more often at fault than the source or generator of the current. The conductors or carriers consist of the wires between the engine and battery or generators, the spark coil and switch connected into this wire, the short wires used to connect the different cells in a battery, and the binding posts on the engine, to which the wires from the battery are connected, and their connections into the interior of the cylinder to the sparker points. Any short circuit in these carriers will cause the engine to work irregularly or go out of operation entirely. A short circuit is any conductor that will carry the current from one wire to the other before it reaches the igniting points. It may be said, for the purpose of illustration, that electricity starting out from a generator seeks the shortest route to get back. If there is not a continuous route for it to travel over, it will not start out; therefore, to make a circuit two carriers or wires from the generator to the engine are necessary. Any piece of wire or other conducting metal left lying around carelessly may

make a short circuit. I know of an instance where a monkey wrench lying on top of two battery cells made a short circuit and cut the engine out of the circuit entirely. A nail may make short circuit connections. If the spark coil gets wet or the insulation on the wire in the coil becomes broken so that two bare wires, side by side, touch each other, a short circuit will occur.

The next matter to cause trouble is a break in the circuit. A wire may be broken beneath its insulation, or some of the connections at the binding posts on the battery cells, or on the engine, switch or spark coil may be loose and disconnected; the insulation on the spark plug which extends through the cylinder walls into the interior of the engine may be damaged and allow short circuit at this point. But a break in the operator's mental capacity is often the most amusing source of trouble. Many an instance can I call to mind where the operator "wore himself out" turning the wheel and "fumed and fussed around" because his engine would not start, when it was found that the sole cause of his trouble was his forgetting to throw in the battery switch. This is a common trouble, ridiculous as it may seem.

To locate all breaks in the circuit that are liable to occur, the operator must begin with himself and follow the circuit clear through to the igniter points. The igniting mechanism on the engine often becomes worn or mis-adjusted, so as to prevent its successful operation. The igniter points may become corroded or covered with carbon and should be cleaned and brightened up with a fine file. The mechanism that brings them together may become so worn as to prevent the points making a contact at all. Whatever has been said about the

on the coil, oftentimes becomes inactive by reason of a gummy condition or weakened current. If the vibrator "sticks," it may be often quickly revived by a slight jar with the hand or a turn or two of the adjusting screw; but perfect cleanliness of both the plug and coil will obviate most of the common troubles attributed to them. For the benefit of those who have tube igniter outfits, we will say that the principle trouble met with in tube ignition is due to unclean burners, defective asbestos lining for the tube chimney, scaled tube, both inside and out, and clogging up of the tube passage from the tube to the interior of the cylinder. The remedy for each of these troubles is apparent. If a tube is badly scaled or burnt it should be replaced with a new one, and while the exchange is being made the passage into the cylinder should be looked after to see if it is clogged to any extent, in which case it should be thoroughly opened with a round file or any other tool that will serve the purpose. This article refers only to ignition troubles, because it is regarded by many experts that 70 per cent. of the common troubles with gas engines can be traced to the igniting apparatus.

(To be continued.)

On Using a Wood-working Shaper.

J. VESTAL.

If you have power of any kind in your shop, it will pay you well to put in a shaper or edge moulder, as some call it. You can make one that will answer all purposes. But I always prefer to buy my tools and machines, as the manufacturers understand what they are made for and are generally well posted on what they make, the same as we are on sharpening plows and shoeing horses.

Some mechanics term the wood-work-

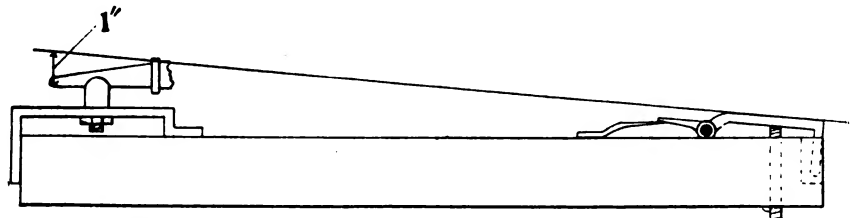


Fig. 1.—ILLUSTRATING THE METHOD OF SETTING THE AXLE TRAM.

source of the current being weakened, short circuit, and break in the circuit, holds good alike both in the touch and in the jump spark methods of electric ignition. But inasmuch as the jump spark has a different spark plug, spark coil and mechanism, this part of the arrangement may require different attention than the other.

The spark coil, or rather the vibrator

ing shaper as dangerous, but this is not so when it is properly handled. I prefer a single spindle shaper that can be reversed, and I put on bits so I can cut either way. With a machine like this you can mortise and tenon and edge-mould any shaped piece you may have. You can cut your wagon felloes the proper shape, round them on the inside, finish wagon tongues and double-trees,

and do most any work where a smooth surface is wanted, especially on irregular and bent shapes.

To illustrate, suppose I want fellows for a wheel 3 feet 8 inches and $2\frac{1}{4}$ inches wide. I take my trammel points and mark off the circular shape on a board, saw it out and then dress up nice and smooth with my circular plane. I use this for a pattern, after getting it to the proper curve and shape. On the inner side of this pattern tack two small pieces of wood as shown at A, in the illustration, at the place where the fellows are to be bored. Laying this piece against the collar, C, of the machine, you will find it to come just under the knife. Now tack this pattern to the fellow to be rounded, B, run the knife along the back of the fellow first, making it smooth and square and then on the inside, making the edge round. Plans for making a wood-working shaper were given in the September AMERICAN BLACKSMITH.

An Axle Tram for the Repair Shop.

Complying with the many requests from readers of THE AMERICAN BLACKSMITH, Mr. C.S.S. has kindly given a more

The feet, SS, are made of 2 by 4-inch stock, and are from $1\frac{1}{2}$ to 2 feet in length, according to the height of the tram. The tie, marked U, is 1 by 4 inches and 4 feet 6 inches long. The tie, N, is 2 by 4 inches, and the braces, RR, are 1 by 4 inches. Of course, the lengths of the braces and ties will vary slightly according to the position in which they are placed.

The arbor, C, is made of $1\frac{1}{4}$ by $\frac{3}{4}$ -inch iron and as long as necessary to admit the longest as well as the shortest axle that comes to the shop. The crotch, A, which slides in the arbor, is made of $1\frac{1}{4}$ by $\frac{3}{4}$ -inch iron with a threaded bolt to go into slot cut in arbor and allow fastening with a nut.

The other end of the tram is slotted, as shown by dotted lines, to admit D, and to allow for movement from the highest to the lowest position. D is made of $1\frac{1}{4}$ by $\frac{3}{4}$ -inch iron and is six inches long at the top on which the axle rests. The part which moves in the slot is from four to six inches long. The standard, F, is $3\frac{1}{2}$ inches high and is made of $\frac{3}{4}$ by $\frac{3}{4}$ -inch iron. G is the same as F, except that it has a slotted hole in

as it is turned around. Remember always to put the bottom of the axle down on the tram.

Hints on the Working of Tool Steel.

W. P. WOODSIDE.

In heating tool steel for forge use, as much care must be exercised as in heating for hardening. Uneven heating, or heating too fast, is the cause of a great many cracks in hardening. Suppose we have a large piece to forge; if we put this piece into a very hot fire and force it as quickly as we possibly can to a very high forging heat, the outside will be very soft and in a nice condition for forging, while the center will be not more than red. Now, if this piece is put under the hammer and forged, the outside being soft will naturally slide over the hard inside, tearing the soft outside from the hard center and we have a piece of steel that is entirely ruined. If the effects of this treatment do not show up in the piece before it is hardened it certainly will after. Now, if this piece had been heated soft all through (more time taken in heating), or if it had been only red hot all through, providing we

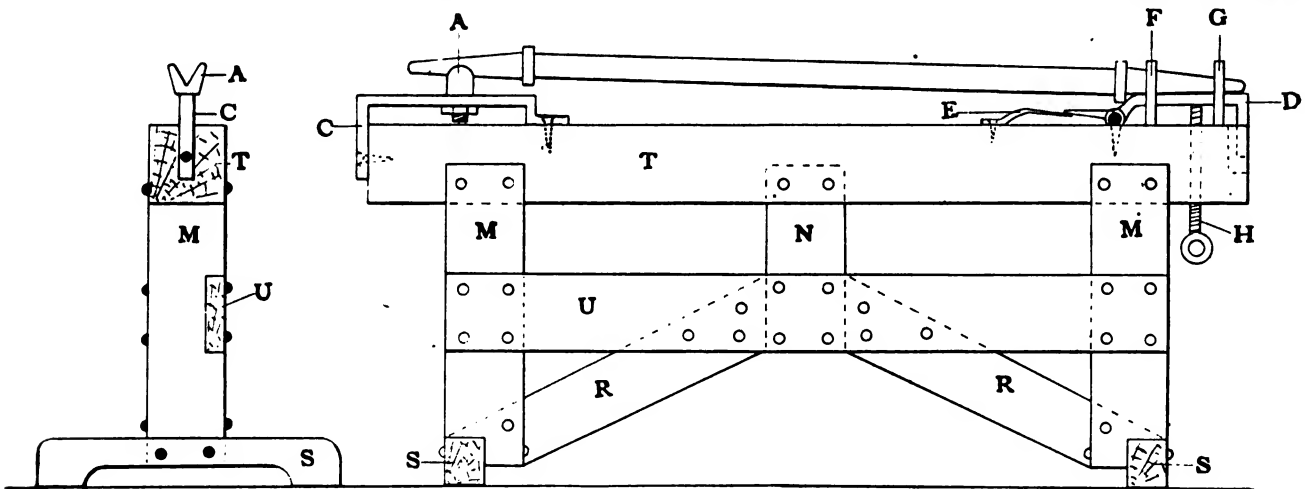


Fig. 2.—FRONT AND SIDE ELEVATION OF AN AXLE TRAM FOR THE REPAIR SHOP.

detailed explanation of his axle tram, a description of which appeared in the August number of the paper. Our readers will notice by referring to the engravings that several changes and improvements have been made since the publication of the article in August.

The frame of this tram is very easily made, and, excepting the dimensions of the several parts, can be readily understood from the drawing. The piece marked T is four by four inches, and five feet six inches long; MM are each four by four inches, and long enough to raise the top of tram about three feet from the floor, or high enough to conveniently adjust the tram when in use.

the foot so as to allow for shifting to and from axle, according to the gather. The spring, E, is to keep the gage, D, down tight on the screw, H.

To set the tram, lay one end of the axle in the crotch, A, and the other end on the gage, D. Now stretch a line from one inch above the end of the axle in A, to the gage, D, (refer to Fig. 1) and adjust the set screw until the top of the gage conforms with the line. You will now have the right set for your axle.

In reversing the ends of the axle, remember that the axle turns from you instead of towards you, as before reversing. If you don't want any gather on the axle, it will touch on both sides

use heavy blows, it would have forged perfectly sound and good. A very high heat can be used without injuring a piece if there is much forging to be done on it or its size is to be much reduced, providing we use care in heating it even and soft throughout.

But we have another thing to avoid, that is, having the steel lay in the fire too long after it has become ready to forge. This is called "soaking," and is very injurious, as it leaves the steel brittle, and when a piece is broken and the fracture examined, it will appear dry and dead looking, lacking that velvety lustre. When the steel is properly heated, forge it into shape as

quickly as possible, but do not work it too cold or with light blows. Keeping steel at a high heat exposed to the air causes it to decarbonize. Forging too cold will rupture the grain and make it flakey like pie crust, which, in a lot of thin tools, such as chisels, axes, etc., causes cracks along the cutting edge.

Suppose we forge a 1½-inch square piece down to one inch square on the point with light blows. We have drawn

should by proper annealing. The piece should be allowed to lie until entirely cold, then reheated to the annealing heat and annealed in lime or powdered charcoal. Always see that the annealing box is free from dampness, and if the piece to be annealed is thin and lime is used, it is best to warm the lime a little by placing a hot iron in it before putting the piece in. We anneal steel to make it easy to machine or file to shape, and

then sticks to that brand. No careful man will attempt to get the best out of a piece of steel without first studying its properties and everything about it.

Making A Two-Wheeled Tip Dray.

J. LAWRENCE HILL.

This style of vehicle is very common in the South Pacific Islands, especially in New Zealand, from whence it is exported to the smaller islands. Two-wheeled vehicles are seldom used in this country, and when they are, it is chiefly for pleasure, but in other parts of the world they form a very large percentage of the vehicles used on the farm and for general hauling work.

The accompanying engravings will give some idea of the extent to which two-wheelers are used abroad, and will convey a further idea of the art necessary in properly balancing a load. These photos were taken by the writer in France, while on a tour of the world.

Two-wheelers have many advantages, one of them (an important one, too) being that there is a less number of wheels, axles and other parts to take care of and repair. Then, too, they are more easily handled. Take a long wagon and try to turn around in a small space, and then try a two-wheeler, and you will soon see with which one the advantage lies. When properly balanced, this vehicle will not be any harder on the horses than a four-wheeler; in fact, it is not so hard, for the way a wagon tongue bangs from one side to the other on a rough road is nothing short of cruel.

From Fig. 1, the side elevation, a general idea of the construction is ob-



A PECULIAR CART USED IN FRENCH CITIES AND TOWNS.

the outside over the center. This can plainly be seen by looking at the end of the bar; in the center there is a hollow. Now, if we were to continue this drawing until the piece was ½ inch square on the point, we would have a piece with a piped center which would very likely give us trouble when hardened. If you have a piece of 4-inch round stock to be shouldered down on the end to 2-inch round, do not attempt to roll it under the hammer and round it down at the beginning, for if you do you will most certainly have a burst center. The proper way is to first square it, then knock down the corners, making it octagonal, then knock down the eight corners, making a piece with sixteen sides to it, when you can safely round it.

In annealing use great care to heat the piece uniformly and thoroughly. Do not use too high a heat and remember that the annealing heat is lower than the hardening heat, and the hardening heat lower than the forging heat. A great many smiths take a piece they have been forging and have finished to the desired shape and will thrust it into the annealing box and let it go at that, or they may return it to the fire and heat it up a little more before putting it in the box. Now this is a very bad plan. Of course, it is all right to put it into the box to cool down, but it should not be let go at this as being annealed, for the grain will not refine the way it

also to relieve the strains caused by forging and working. Steel properly annealed will cut very soft, harden very hard without cracking, and when properly hardened and tempered will be very strong and nicely refined. Using a high scaling heat in annealing leaves the steel with a harsh oxide iron scale on it, which is very hard on the tools used to rough down the piece. If this high heat is continued for awhile it leaves the steel brittle, liable to crack



A UNIQUE METHOD OF LOADING GRAIN ON TWO-WHEELED CARTS IN FRANCE.

in hardening and impossible to refine, and has the same effect upon the appearance of the grain as the soaking heat, previously described.

The wise steel worker is he, who upon finding a quality of steel to suit his needs, studies its various properties and

tained, and also the length and height. The side-board, A, is ¾ inch thick. B is equal to the thickness of the guard irons, E, in this case, ¾ inch. It is merely a cleat, stiffens the ends of side-boards, and makes the catch for the tail-boards easier to put on, as the surface is level;

by running the cleat up to the top of guard iron, it keeps the side-boards firm on the bottom.

To make the tail-board catch, take a piece of $\frac{3}{4}$ -inch round iron five inches long, punch a slot in one end, and two inches from this hole draw down to $\frac{1}{4}$ by $\frac{3}{4}$, then bend as shown. This gives more strength, as the bolts do not follow the same grain in the wood. D is made from hard wood, three inches for heavy work and two inches for light work. Over the axle it is five inches deep and

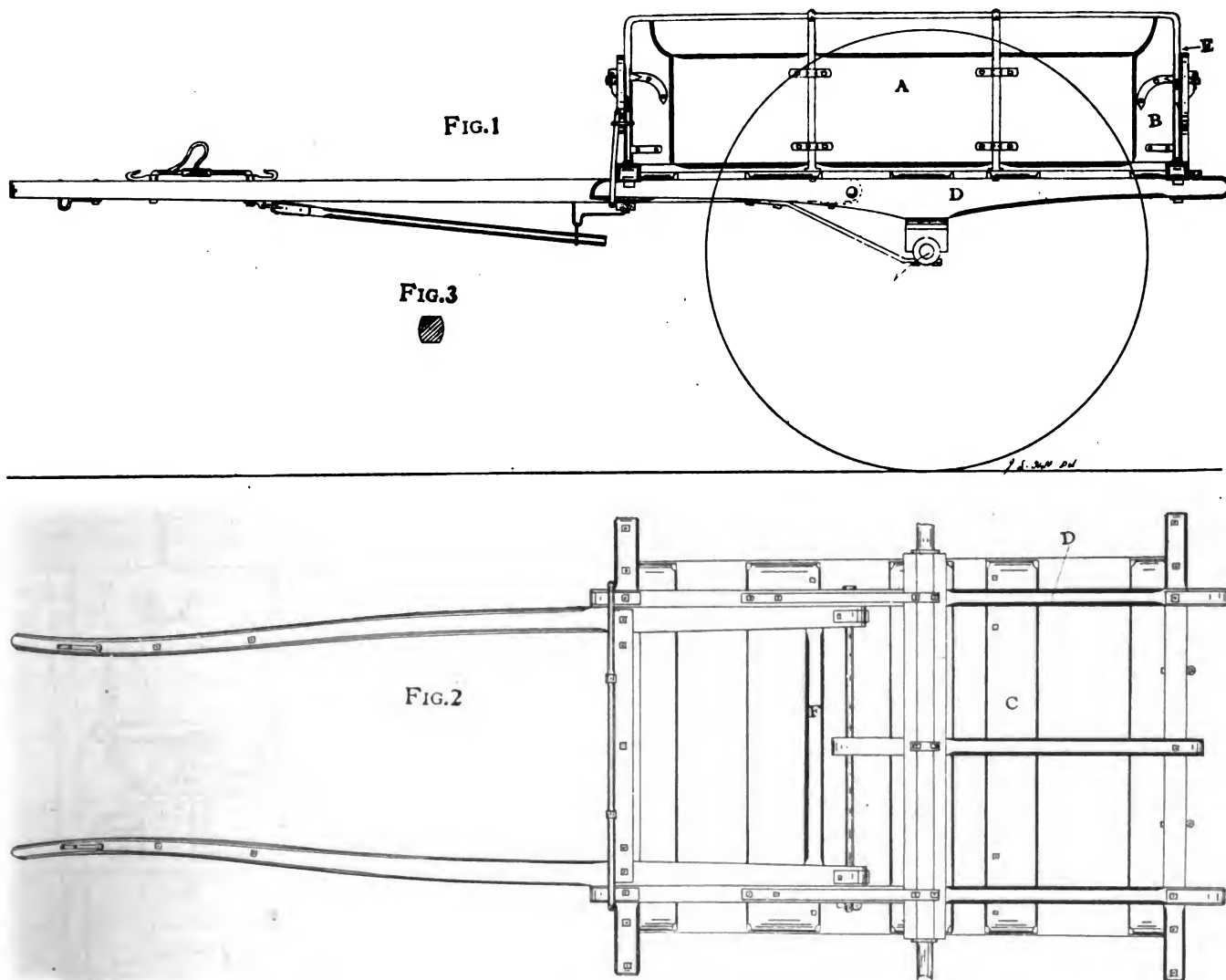
D is checked into the bars $\frac{1}{8}$ of an inch. Fig. 3 is a section of the shaft to show how they are dressed up.

The traveling hook for the back strap or chain only requires to be pushed forward to allow the link to be put in, and when there, it is impossible for it to work out, consequently there is no danger of it getting loose should the shafts be lifted off the horse's back.

The hook on the forward part of the shafts is for an additional horse or two, to pull from. It is made of $\frac{3}{4}$ -inch round

is 4 by 6 inches, of hard wood, and should be checked about $\frac{1}{4}$ -inch over the blades, D, in order to give it more bearing. This axle bed is fastened to the body as shown in Fig. 2 by six $\frac{3}{4}$ -inch bolts. A piece of an old tire makes good yokes. Cut two of the three long enough to go forward about two feet and bolt the front end under the blades as in Figs. 1 and 2.

Fig. 4 shows the half front, with the method of working the "Tip." It will be seen that all there is to do is to raise



Figs. 1, 2 and 3.—PLANS FROM WHICH TO MAKE A TWO-WHEELED TIP DRAY.

$3\frac{1}{2}$ inches at the ends. C is $\frac{7}{8}$ -inch soft wood, any convenient width from 6 to 12 inches. The bottom boards are $\frac{7}{8}$ inch thick. The feet of the standards, Fig. 6, are let into the bottom from the underside, consequently the guard irons are all in position and fastened before the bottom is put in; after that the sides are put on.

The front and back cross-bars are $2\frac{1}{2}$ by 3 inches, of hard wood, and a $\frac{3}{8}$ -inch plate is fastened on top to take up the wear. These bars are to be $1\frac{9}{16}$ inches above top of D, which means that

iron, with a $\frac{5}{16}$ -inch bolt through the back. The front is made into a tapered rivet, $\frac{1}{4}$ -inch at the riveting point, and goes right through the shaft.

The axle is a two-inch Concord, fan-tailed. This makes it very much lighter, reducing the weight in the center, where strength is not required. The writer has seen some men put in only the stub. They punch a hole in the square of the axle end, and put a bolt through as shown at F, Fig. 5. It is then let into the bed as shown by the dotted lines in Figs. 4 and 5. This bed

the link and pull the handle forward; the body then being released from the shafts will easily tip up. Fig. 10 shows the complete tip iron and how it is attached to the shaft bar. It is made from $\frac{3}{4}$ -inch round iron.

Fig. 4, A, illustrates the style of end boards, and how they are kept in place. Figs. 11 and 12 explain this more clearly, Fig. 12 showing an eye bolt, which is put into the cross bars, with a nut on the inside. It is usually made from $\frac{1}{2}$ -inch round iron. For Fig. 11 a piece of light old tire comes in handy. Just draw one

end down to $\frac{3}{8}$ inch round and point it, then bend slightly forward. The door is put in at an angle, and this bend allows the point to enter the eye bolt and work on the hinge principle.

In Fig. 5 is shown an end view of the guard iron and its brace. The guard irons are $\frac{3}{4}$ inch round and the brace $\frac{1}{2}$ inch round, welded to the upright standard, both having a collar, as

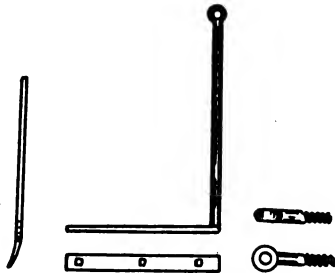


FIG.11 FIG.6 FIG.12

PARTS OF IRON WORK FOR TIP DRAY.

shown. The ends are threaded, one $\frac{3}{8}$ inch, and the other $\frac{1}{4}$ inch. Fig. 9 is the center blade. Owing to the shaft cross bar, it has to be shorter than the side ones.

Fig. 6 illustrates the center standards. The foot is $1\frac{1}{2}$ inches by $\frac{1}{2}$, drawn down to $\frac{5}{16}$ and 12 inches long. The upright is $\frac{3}{4}$ inch round, jumped up and welded onto the foot. The eye hole can be made either by upsetting and punching a small hole and gradually swelling it to the required size, or it can be drawn down to half round and bent around a $\frac{3}{4}$ inch bar, and the end then welded into the body of the standard.

Fig. 7 shows two views of the front shaft bar with an iron plate on top, the bolts in the end going through the shafts; in boring through the shafts, give the hole a little draw. This will keep the shafts close up to the shoulder of the bar.

Fig. 8 shows two views of the back shaft bar. This is shown in Fig. 2 at F. It is mortised into the shafts just ahead of the iron hinge bar and the bolt which holds the iron cap in place also holds the tenon. The hinge bar is $\frac{3}{4}$ -inch round, with a flat cotter pin to keep it in position. Both the back ends of the shafts and the front and back ends of the blades are capped with iron. The shaft caps, however, are light, but the others should be $\frac{1}{2}$ inch thick on account of the wear on them.

For painting, an attractive combination and a good wearing one, too, is to make the body light blue, mixing ultramarine blue and white lead. The chamfers and other striping are bright yellow; axle bed, shafts, blades and wheels,

bright red; guard irons, axle, clips and other iron work, black.

Farmers will find this the handiest of vehicles for use on the truck farm.

Paint Your Wheel Rims.

C. M. S.

I was setting tires long before many of the readers of this article were born.

In several factories I have noticed that when priming wheels they neglect the face of the rim, where the tire goes on. This is a very serious thing, and a great injury to the wheel, for being left bare of paint, this part of the rim is always in a condition to absorb considerable moisture.

Several years ago I took charge of a factory, and the first thing I noticed was that the rims of all wheels were bare of priming on the face. When the next lot of wheels were ready to prime I told the boss painter to prime the rims all over, taking care to get as much as possible on the face. He replied, "Why, we never do that, the tire covers it." I told him it would be done on all wheels from that time on.

Before I took charge of this factory they had to replace about 5% of their wheels. Afterwards, with the rims well painted, there was less than 2% to replace, and they used exactly the same

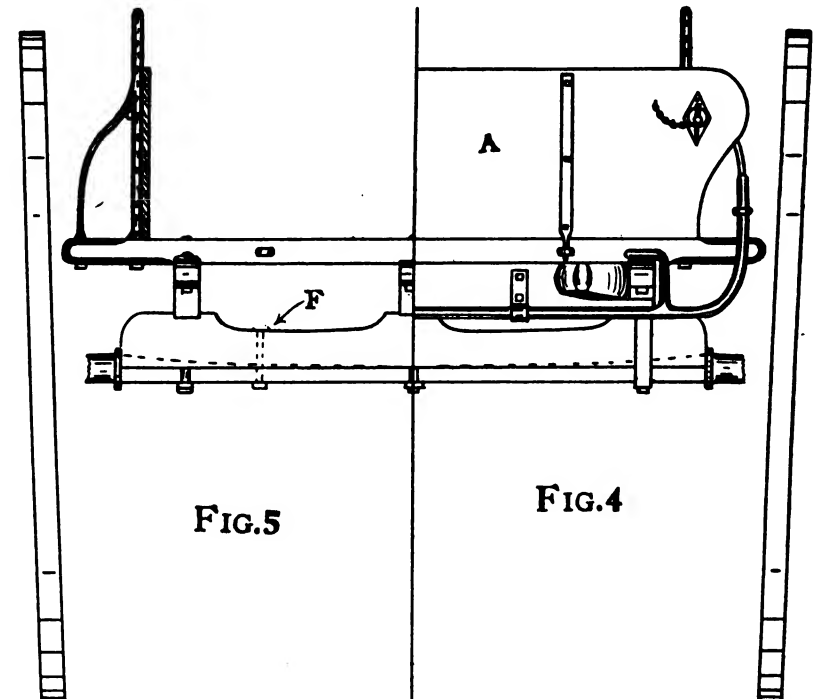
with a tire properly set, the wheel will retain its shape and elasticity a much longer time than without painting.

In my opinion no cold set tires are as good for the wheels as those shrunk on by an even heat; but there are so many "red hot" cold tire setting men around, it is not safe to argue this point.

Filling Sarven Wheels.

M. A. FOSTER.

I noticed in the October issue of THE AMERICAN BLACKSMITH an assertion made by H. K. Van Tyne & Son. In regard to the repair of Sarven wheels, they state that 14 years' experience in a factory and 19 in a repair shop, has taught them never to cut a rivet in a Sarven or other hub. They also state that a man that cuts a rivet ought to be compelled to pay for ruining the wheel. My theory on this matter is somewhat different. I think a man who repairs a Sarven wheel as they have described it should be liable for damages instead of paying for not fixing or repairing the wheel. I have repaired Sarven wheels for 20 years. I have cut every rivet out, also had the flanges off the hub, but never had one come back to my shop because it did not stand, nor did I ever have a man claim damages for cutting the rivets.



Figs. 4 and 5.—SHOWING FRONT HALF AND REAR HALF OF TWO-WHEELED TIP DRAY.

quality of wheels and had the same workmen to make them.

It is a great improvement to give the face of the rim a coat of rub lead after the priming is dry. Be sure the priming goes in well around the joints and covers the ends of the spokes well; then,

Now, if you don't cut out the rivets you have to cut a notch in the lower part of the spoke tenon to let the spoke drive up in proper place. There is a vacancy between the spokes below the rivet which looks like a botch job to me. They claim the factory applies from 20

to 50 tons' pressure on the flanges. Do you think you could take a small Sarven spoke with a notch cut out to let it pass the rivet and drive them tight enough to get a pressure from 20 to 50 tons against the flanges? My experience in riveting a hub is, be careful to select rivets that will fill the hole in the flange. Cut them the proper length, use a light or small riveting hammer, strike lightly and as the rivets begin to draw, strike the flange occasionally so as to drive them against the spokes. Go over them two or three times, keeping the heads of the rivets on the anvil and if you have used the proper size spokes you will certainly have a good, solid job. I will admit if you use rivets that are too small, cut them too long or too short, or use a heavy hammer, you will kink the rivet instead of drawing it and the job is worthless. In regard to W. Otto, his theory is very good, provided you have to fit spokes, but my advice is not to fit them if you can possibly help it, but get the proper size and you have them already fitted by machinery, which is better than any man can do by hand, provided the machinery is operated by a skilled mechanic.

How the Sand-worn Tire Was Welded.

T. U. BULCAN.

I was riding along through a wood, admiring the scenery and thinking about nothing in particular when a bend in the road brought me within a short distance of an emigrant camp,

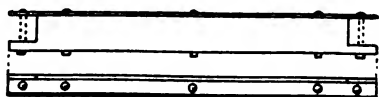


FIG. 7

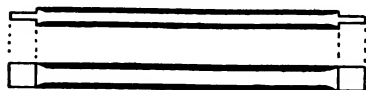


FIG. 8

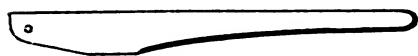


FIG. 9

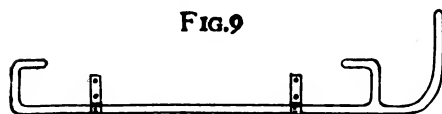


FIG. 10

DETAILS OF CONSTRUCTION OF TWO-WHEELED TIP DRAY.

consisting of two Conestoga wagons or prairie schooners. I found upon inquiry, that the man of the "house" was at the blacksmith shop having one of the tires mended.

I had noticed when approaching the encampment that the tires of the wagons were worn concave by much traveling

through sand. A cross section of the tires would appear like "A," in the engraving, and knowing this would perhaps be a "stickler" for the smith, I excused myself and hurried to the smithy near at hand.

Here I found the smith puzzling over the broken tire, so I approached him and said that if he would keep me until Monday (it was Friday) and subscribe to THE AMERICAN BLACKSMITH, I would have the tire on the wagon in about an hour. He consented, so I started to weld the tire which puzzled him.

I heated one end of the broken tire and set it in a fuller to get the flat part on the other side, thinned down the thick edges a little and also thinned down the ends of the two broken parts. I now put the two parts together, as at B, placing the end which I heated and changed on top of the other end. This left a hollow between the two ends, as seen at G in the engraving.

I now swaged a piece of iron like C, punched a hole, as at H, and cut as long as the lap in the tire. This piece I fitted into G, punching a hole through the tire in line with the hole at H, and putting in a rivet. I now heated this joint, welded it and drew it out at this part to the proper size for the wheel. We then built a brush fire to heat the tire all around and reset it on the wheel.

Gasoline Engines for Blacksmithing.

A. BRUTON.

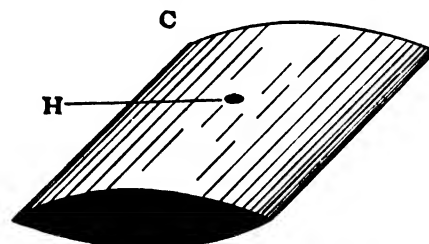
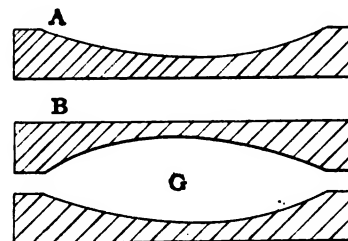
Does it pay to put in a gasoline engine? I say yes, and it pays well. It increases trade two or three times over, and does work better and easier. People will come and bring you work just to see how you do it, and also in order to get a good job done. With a trip hammer, you can sharpen more plows than two men can by hand and do it much better. You can do more difficult drilling, for you have both hands to hold your work, and can grind discs on the emery wheel while doing something else, thereby doubling the value of your time. The cost of fuel for my 24-horsepower Weber Junior, (made by the Weber Gas & Gasoline Engine Co., Kansas City, Mo.) is from one to four gallons per day of ten hours, according to the load pulled. It will run without an engineer, saving a cost of \$2.00 per day, over steam power. It will grind feed and help keep expenses down, and do many things at a small cost according to the power required. With my engine I run a drill, a trip hammer, an emery wheel, a polisher, a grindstone, a feed mill and a blower. Of course,

not all at one time, for that would be too much, but from one to three at a time as required for two men working in a shop. For general blacksmithing work of all kinds the gasoline engine needs no firing to start it, and there is no fire to bank when stopped. It is in general the cheapest, best and handiest power for all around work and is far ahead of steam or horse power.

The Welding of Flues.

A. W. STARVER.

The first thing to do when repairing flues is to determine how far the old



SECTION OF SAND-WORN TIRE AND IRON USED IN WELDING.

tubes are damaged. When this has been found out, cut the damaged portion entirely off, leaving nothing but good, solid tubing. Next, clean the scales off with an old rasp.

Now take a piece of tubing of the required size and length, scarf the ends and hammer the edges out slightly so it will fit over or outside of the old tube. Now drive them together and weld. In welding, a support should be made in the forge to prevent the pieces from pulling apart, or a rod with a flange on one end and a thread and nut on the other, should be inserted in the tube. The nut, of course, should be screwed tight to hold the parts together. Don't use your regular hammer for this work, but make one by taking a round rod about $\frac{1}{2}$ inch in diameter and bend one end of it to serve as a hammer-head. Tap lightly upon the lap, at the same time turning the flue. Use plenty of borax to prevent burning and also the formation of scale, or better still use a mixture made up as follows: five pounds of borax and one pound of Venetian red. Apply this to the joint while heating in the fire. This mixture has been used for many years, but perhaps is not generally known.

Castles in the Air.

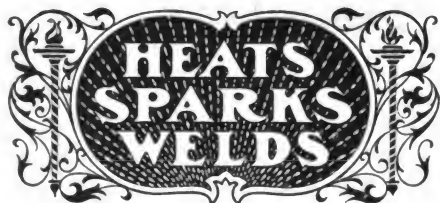
JACOB GOUGH.

Amid the myriad troubles that meet us day by day,
Who would not from the conflict a moment turn away;
And in a far-off fairy land, where men no burdens bear,
Forget awhile our tears and toil in castles in the air?

When many a bright-hued prospect fades fast beyond our view,
And hopes which neared fruition prove shadowy and untrue;
May we not in that dreamland, beyond all clouds and care,
Behold our paradise restored in castles in the air?

Oh, there are lovely chambers in every home and heart—
And in life's song of sorrow, each one must bear a part.
But hark! what mystic melodies soon hush the voice of care,
As parted hands are clasped once more in castles in the air.

Then never grow discouraged, though fortune favors not,
And we pursue life's pilgrimage unnoticed or forgot;
We have an hour of victory and lustrous laurels wear—
For all are kings and conquerors in castles in the air.



Christmas bells will soon be ringing.
Encourage young men to enter the craft.
Snow, ice and sharpening.—Have they visited your parts yet?

Buell, Oregon, is in need of a good blacksmith. Write D. C. Walker.

Appearances count. Has your shop a neat, busy and prosperous air about it?

The twelfth month of the year—a good time to clean up old accounts so as to start the new year fresh.

A big hole is the New York City rapid transit tunnel recently opened, with a length of over 22 miles.

We've been waiting for that photograph of your shop. If you have one, inside or outside view, let us have it.

A monster lever shear has recently been built by a Pittsburg concern to cut steel six and a half inches square, cold.

Are you in line for one of our 1905 calendars? If your subscription expires before January, renew now so as to be sure of one.

A great many subscribe to THE AMERICAN BLACKSMITH for a year as a Christmas present to a smithing friend. A good idea.

One hundred thousand tons of grapes are grown annually in Chautauqua County, New York; in all, more than eight thousand car loads.

Last call for calendars. If you want fifty of our 1905 calendars with your name on

them, to advertise your business, your order must be mailed at once.

Forty-five negro women are today engaged in this country at trades classified in the census bureau reports as blacksmiths, machinists, or iron and steel workers.

Report has it that more steel is used in the manufacture of pens than is consumed in all the sword and gun factories of the world. Is not the pen mightier than the sword?

When the farmers are flush, make them pay up. Press collections now. It isn't good business to let accounts run without attention, and if you have earned the money you ought to have it.

Fifty thousand copies of our January issue will be sent out. If you know of anyone, not a subscriber, that you think would like to see a copy, send us his name and we will mail him one free.

Does your custom grow? A liveshop in a live community ought to do more and more work each year. How does 1904 compare with 1903? Is your trade growing? If not, something's wrong. Better look into it.

A successful smith once said he considered his prosperity was due to giving his patrons their work a little earlier and a little better than was called for. Not always easy to do, but profitable in the end. Try it.

Get together. Don't grind along, fighting brother smiths, cutting prices and robbing your family of all the comforts of life. Unite with the craftsmen of your neighborhood for higher prices, mutual protection, lien laws, and the like. Get together.

The year's end is a good time to lop off unnecessary expenses. Are you buying as close as possible? Every expense reduced adds just so much to profits. But don't make the mistake of cutting down the amount you may devote to advertising the shop. Rather increase it.

December twenty-first is the shortest day of the year. After that the days will begin to stretch out. This doesn't apply to those of our readers who are on the other side of the equator, in Australia, New Zealand or South Africa. For them it is the year's longest day.

Don't be a gloom distributor. It doesn't pay. Talk happiness and good cheer. Remember also that it is as easy to grow roses from seed potatoes as it is to prosper if you continually talk about hard times and poor business. Think, talk and act success, and the harvest will be like in kind.

A smithy on wheels is the property of one O. E. Hughes, a blacksmith and all-around mechanic. He has a traveling house with shop attached, and is not only earning a good living from his moving equipment, but is also bettering the health of his wife and daughter, which is the primary object of his moving outfit.

A Spanish blacksmith, Pierre Riera by name, is fighting in the French courts for an estate of forty millions, which he claims he has been defrauded out of. His story reads like a novel, and if true, means that the large fortune, rightfully belonging to him, has been enjoyed by an imposter, who has no claim to it whatever.

Stick. Don't give up the craft. If it's not paying you, advertise, raise the standard of your work and your prices. If it's

too severe work, put in power; make men and machines do it for you. If your locality is bad, move. Skilled smiths grow scarcer every day, and wages rise with demand. So whatever you do, stick to blacksmithing.

The wide-awake smith is always on the look-out for new trade. He has a neat business card or circular to send the new, possible patron who moves into his district, or else he manages to meet the new-comer personally and get acquainted. The craftsman who keeps his eyes open widest usually sees the fattest wallet at the end of the year.

The world's supply of cotton and corn is raised in the United States. This country produces one-fifth of the world's wheat, four-fifths of its corn, one-fourth of its oats, and four-fifths of its cotton. Agriculture will this year add about four billion dollars to the country's wealth, nearly one-fourth of this amount being paid to us by foreign countries for the produce which we ship to them over the seas.

An age of wonders truly is this. By means of the telautograph, hand-writing at one place may be duplicated at another. With simply an electric wire connection, every motion of the pencil on the transmitting apparatus is exactly and immediately reproduced at the receiving end. And now comes the Baldwin air ship, performing successful evolutions in mid-air above the St. Louis World's Fair. What next?

To the apprentice. Do you realize that a good trade journal devoted to your craft is like a school whose teachers are men with experience in every section of the country? How else, indeed, than by such a paper could you learn the views and profit by the knowledge of hundreds and hundreds of the best craftsmen of today? The wise apprentice never lets the subscription to his favorite trade paper run out.

One month more. January 1st is the date, you remember, before which we want each of our readers to get and send us one new subscription. Have you sent one in yet? If not, show your paper to a neighbor smith and get him to subscribe. By the way, it would be a splendid Christmas present to us, and we in return give you six months' credit on your subscription for each new reader. Will you send one—before the year ends?

Tom Tardy tells a tale of hard luck, as he calls it. Some folks might give it another name, but—well, here is the story: Tom had a customer who was owing him a bill of nearly a hundred dollars, and it had been standing for quite two years. The man's reputation for paying was not any too good, though he had money, so that when rumors began to circulate that he was about to leave town for good, his other creditors began to press him to pay up and almost every one of them succeeded in getting their money. Just about that time, though work was brisk, Tom had planned to close his shop and spend a week at his brother's up in Canada, hunting and fishing, for you know our friend has some of the sport in his make-up. Of course, his trip could not be postponed, so sending a statement of account to his man, away he went. When Tom came back, he found his bird had flown to parts unknown, and he is bemoaning what he calls his hard luck. "He owed it, and he ought to paid it," says Tom.

American Association of Blacksmiths and Horseshoers.

Lien Law Agitation.

In view of the near approach of the legislative sessions in most of the States of this county, we invite all readers of THE AMERICAN BLACKSMITH to take an active interest in the above-named matter. Almost every reader of this paper, because of his position, is desirous of having his labor protected by legislation, and we desire all those who would be thus benefitted to place themselves on record by writing us a brief note to this effect, stating whether or not their active support can be counted upon. Blacksmiths, horseshoers and wagon makers who have lost any considerable amount from bad debts, realize the importance and necessity of such statutes, and all probably recognize also that if the craft is to secure such legislation in their States, they must ask for it, work for it and agitate the cause.

Let all those who recognize the needs of such legislation and who would be willing to lend their support and influence and effort to secure the passage of a bill of this kind, drop the American Association a line to this effect.

Briefly outlined, the scope of the Lien Law, such as we propose, is that it shall permit a smith to place a lien upon horses or vehicles, upon which he has applied either labor or material, in order to secure satisfaction of his claims for payment. Many States permit the article to be held in the shop until the charges are paid, but most craftsmen agree that this is of little practical value to them. What is needed is something which will enable the horse or vehicle to be held after it has passed from the shop and after all proper and business-like efforts to obtain collection of the charges have failed. Such legislation would bring into the pockets of the craft annually hundreds and thousands of dollars which they rightly earn, but which they are beaten out of by unscrupulous parties. The blacksmith is of all craftsmen perhaps the most unfortunately situated as regards collections of his claims, and he of all others needs every possible protection for his labor.

The Ideal Blacksmith Shop as Equipped for General Railroad Work.*

We think the ideal blacksmith shop of today is the one built of structural iron encased in brick, the roof having been given due consideration. It has a large factor of safety after the

* Report by Mr. A. W. McCaslin, read before the N. R. M. B. A., Convention at Indianapolis.

jarring from the large steam hammers and the support for the masts of the necessary jib cranes carrying from four to five tons each while working under a steam hammer, has been determined. The altitude of the eaves from the floor line should be about thirty feet. The roof should be of the Monitor design, with pivoted windows at each end and the sides. The three-sash windows in the walls are preferred, bottom sash to hoist and top sash pivoted; thus inviting a good current of air in the shop. The accommodations of ventilation and light should be at least 60 per cent. If the ideal smithshop is being erected with the view of a greater output the proper dimensions can be determined only by the superintendent of motive power, or master mechanic advising with the foreman smith as to the per cent. of increase intended over the old conditions. Newness alone will not produce desired results.

In this shop the first consideration as to the necessary dimensions should be that of forges; the design and number necessary and the number of square feet of floor space required for the same. We think double forges preferable and most economical in floor space when placed on an angle of 45 degrees, with fifteen feet from wall to center of the stack and fifteen feet from center to center of stacks, allowing twenty feet from center of stack toward center of shop for working room. These two forges and their working room will occupy 525 square feet of floor space, and placed at an angle of 45 degrees, will be perfectly adapted to any class of work desired,—aside from frames and furnace work. In placing single forges along the walls there should be at least five feet of space between the wall and center of stack, and the space between centers of stacks and the working room same as allowed the double forges—15 ft. and 20 ft. respectively, making 375 square feet of floor space necessary for the single forge against one-half that essential for the double forges, which is 262 square feet, leaving 113 square feet in favor of each forge placed back to back, or 225 square feet in favor of each double forge as against two single forges. Should the single forges be placed tight against the wall, which would be an expensive position when convenience of handling the work is considered, for convenience in this case means output, the saving even then in floor space in favor of the double forges against the two single forges would equal 75 square feet, and the number of stacks in the

single forge plan and the holes in the roof will be increased 100 per cent. If stacks are not employed you have not an ideal shop, but rather an ideal smoke-house for the smoking of men, and when stacks are employed the throat of forge hood at the stack connection, and the stack as well, should be large enough to not only accommodate the smoke and heat in their natural tendency to ascend, but to create a draught that would cause the surrender of all the smoke and a greater part of the liberated heat above the fire to its influence.

In connection with railroad blacksmith shops the writer has nothing to say in favor of arranging the forges in groups of four if the best results are desired, or in trying under false pretense to hoodwink the smoke into traveling in the wrong direction. The writer has visited two new shops where such mistakes have been made and feels it some one's duty to enter protest as to the propriety of a plan that will produce an atmosphere in the shop that will simply suffocate or stifle the men who are compelled to work in it.

We think the object of all the railroad companies in building new shops is for the betterment of all-around conditions, as well as a greater output; progression—not retrogression.

In designing forges some thought should be given as to proper dimensions, heating qualifications, storage of fuel, convenience, cleanliness, economy in fuel and shop space, for we know that in many smith shops there is as much valuable space taken up with coal and coke boxes as that occupied by the forge. While we owe much to Tubal Cain, we should not content ourselves today with his style of shop, or a hole in the hillside for a forge. The large or generally termed *big* forges are preferably made circular, and should have sufficient space allotted to them for the convenient handling of the heavy work. The frame forge should be about 36 inches square and made to drop about 12 inches. Such a forge can be dropped quickly and the slow process with the chain hoist avoided and the fire left in good condition for the succeeding heat.

In connection with the forge we find quite a difference of opinion among those who should know, as to the proper volume and pressure of blast necessary for the best heating and greatest output without the wasting of fuel, many claiming great volume with a pressure of five to seven ounces productive of the best results, but the writer, through

experience, has determined to his own satisfaction that any volume that will fully supply each forge with a constant pressure from 14 ounces to 16 ounces through an upright opening in the tuyere equal in area to two or two and one-half square inches is about the proper thing for railroad smith shops, not only in volume but in pressure as well. Seven ounces of blast pressure, no matter what the volume, will not heat iron as rapidly as the iron will absorb heat, consequently with that pressure we do not get a maximum output, while with 14 to 16 ounces of blast pressure regulated to suit conditions and requirements every heat unit up to the limit of absorption in the iron can be utilized, and the earnings of the employer, also the piece-worker, increased, and the worry of the honest day worker through the change from unfavorable to favorable conditions, greatly lessened.

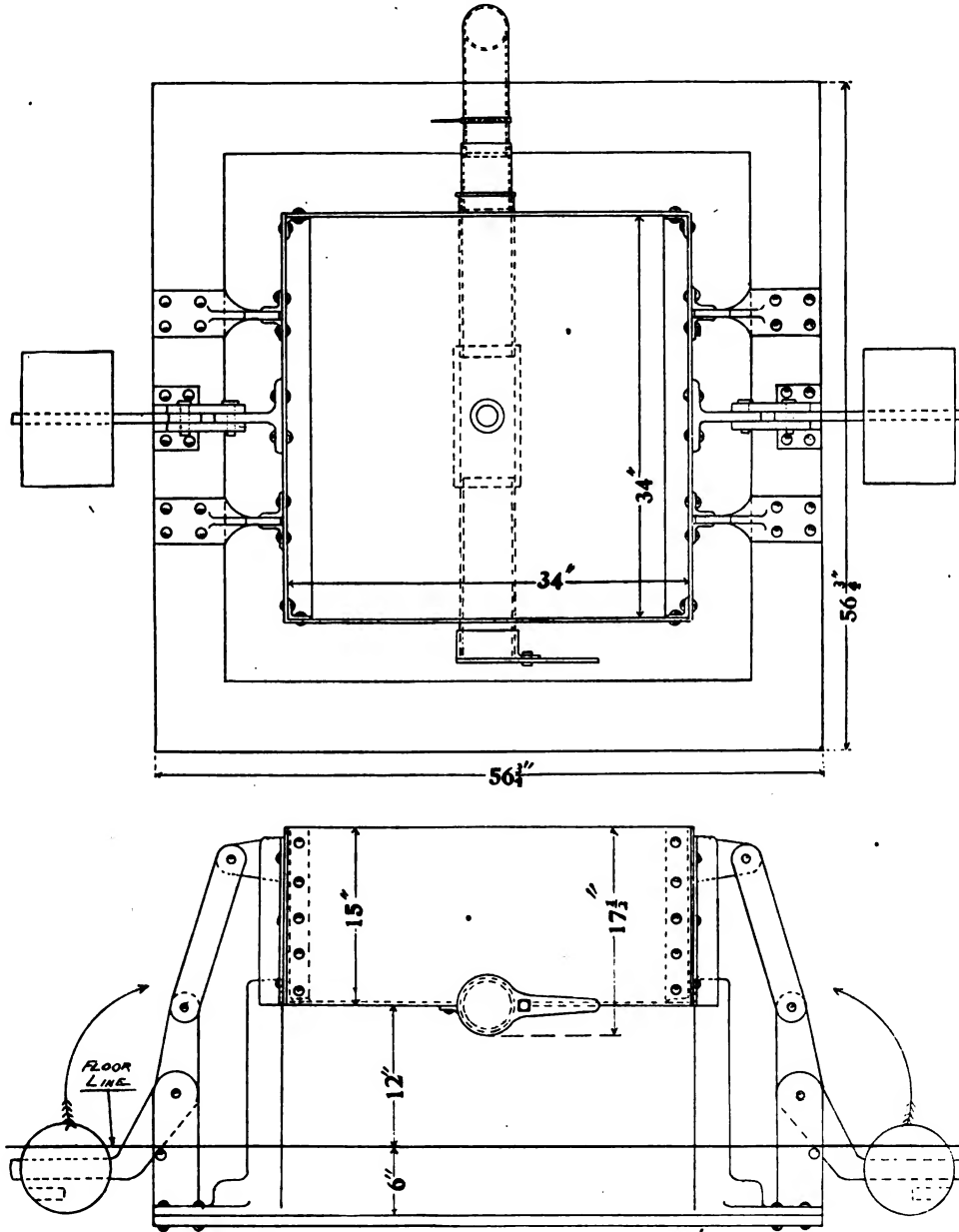
For ordinary work in the railway smith-shop the tuyere should be at least ten inches below top of the forge. With this depth to tuyere and the fire prepared with fine, wet slack, well tamped around a stake, the fire will, with possibly the throwing out now and then of a small clinker, last from seven o'clock A. M. until noon, and with this depth to tuyere, the slag and clinkers do not drop down and clog it as they will at a less depth; besides, we have a body of fuel below the iron sufficient to produce and continue to produce the necessary heat

for the best results, and lessen the demand for a new fire at 9.30 in the morning and 3.30 in the afternoon.

This shop should be ornamented with wrought iron steel-faced anvils weighing from 300 to 400 lbs. each, placed on portable cast iron stands, that the smith may be able to accommodate his work by the position of his anvil. Each

time, its use, from a money-saving standpoint, is absolutely necessary, and in many localities where refined hammered iron of large dimensions cannot be received on short notice its services are required aside from the money-making qualities accredited to it. It does not take a mathematician to be able to figure a saving of dollars each

day in favor of the reverberatory furnace when refined hammered iron in the straight bar is rated at five cents per pound and ordinary forgings at seven and eight cents at the forge. We recognize the fact that steel axles are fast replacing those made of iron, which greatly lessen the supply of wrought scrap for piling purposes, and in time will possibly lessen the demand for the reverberatory furnace for heating scrap and add to its duties as a billet furnace. The demands for furnaces in the smith-shop are many and pressing, as each day calls for a greater output at a reduced cost per item. We should have special furnaces for special classes of work as



PLAN OF THE MCCASLIN DROP FORGE. LIFTING THE WEIGHTS IN THE DIRECTION OF THE ARROWS LOWERS THE FIRE-BED OF THE FORGE.

forge should have a full equipment of tools. Fifty cents expended in the proper tool will earn dollars for the employer, if he places them in the hands of a competent workman.

In returning to the question of facilities for heating, we merely mention the inexhaustible subject of furnaces. If the accumulation of good wrought iron scrap is sufficient to employ the reverberatory furnace a greater part of the

follows: The large reverberatory furnace and the billet furnace, which may be of similar design, which will also make it useful in heating material for small forgings. These furnaces also answer nicely for heating car work to be formed on the machines. Then comes the case-hardening and spring furnaces, and special furnaces for the heading and bolt machines, flue welding furnace, etc. Some of these special

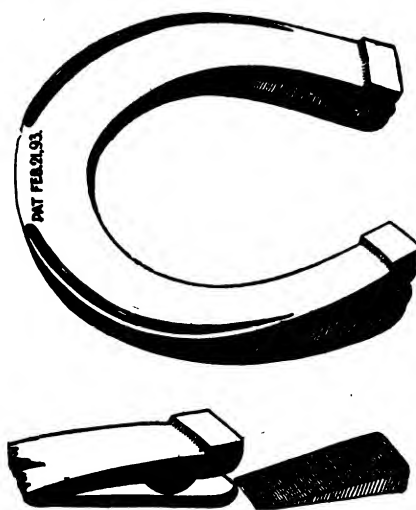
furnaces for special classes of work will increase the output over that of the forge from three hundred to four hundred per cent. as far as heating advantages go, but this would be profitless were it not met by an equal shaping capacity of proper machines. A few of these are mentioned above, as also that noble tool, the steam hammer, only equaled in its grandeur and determination, when properly handled, by the all-but-inspired passenger locomotive with a trailing of ten or twelve coaches as an equipoise, dividing space at the rate of about seventy-five miles per hour. The enumeration of the possibilities of the steam hammer in forging, bending, upsetting, riveting, shearing, coiling and uncoiling, would furnish matter for quite a large volume. It is a universal tool, and few railroad smith-shops have more than fifty per cent. of what they should have of such power, as a deficiency prevents the use of special dies for the different classes of work, and as their use would throw idle those smiths who require plain dies for the work they are engaged upon. Under such conditions the output is slow and unsatisfactory and the profitable or money-earning point not yet reached. This includes the drop and all power hammers.

The service value of a machine or tool is estimated by the difference in the cost of its production against that made by hand. We know that any old steam hammer installed with special dies producing any number of duplicate forgings will show a saving of ten dollars and up each day over the same class of work produced by hand, and if a 1,200 lb. steam hammer can be installed for fifteen hundred dollars the interest in the investment would, at four per cent., amount to sixty dollars per year, or about the profit earnings of the hammer for one week over hand work, and if kept in constant service, would mean a saving or gain of about three thousand dollars annually, and if operated only one hour each day would still be a profitable investment. The loss each year of from three thousand to five thousand dollars through the need of a proper tool should surely not only recommend it, but procure it. The installation of steam hammers today calls for greater consideration than it did a few years ago. The adoption by many of our railroads recently of steel for many parts of their engines calls for heavier hammers, larger piston rods, better kept dies and more secure foundations.

The number of cranes should be ample for all requirements, and when

possible, placed so as to interchange but not interfere with each other. They should be allowed a large factor of safety over the load intended for them, and should have ball or roller bearings, above and below. The pulley over which the real chain runs in frame work should also have roller bearings.

The next tool needed is the bulldozer; the one machine that understands more languages than any other known piece of mechanism. It understands English, German, French, and Italian diction, and many of them are acquainted with Hunkeyism, but they seldom learn Hebrew. Furnished with the proper tools this machine will compare well with the steam hammer in its money-earning capacities and is entitled to all



vacations offered through needed repairs. The up-to-date smith shop of today has steam hammers, bulldozers, heading machines, forging machines, bolt machines, punch and shears, etc., as mentioned above, and the foreman should remember that they were bought for a purpose and utilize them, for with these tools in the shop his legitimate excuses for a shortage of output in their various lines, like the old side blast, are gone forever.

The subject of fuel for furnaces requires too much consideration to be incorporated in a miscellaneous paper, so we will pass it over to the coal, coke and oil men.

There have been several ideal smith-shops erected on our railroads in the last few years and many others are in contemplation. Railroad companies that have built new shops in recent years have been lavish in the expenditure of money in the interest and comfort of the employe, and by the installation of improved machinery and appliances such as already mentioned in this

paper, much of the laborious work formerly done through compulsion by man, is now cared for with little effort. And while the output is increased, the demand for the man is not decreased, and being relieved of the laborious part which was formerly his, should he not feel like increasing his movement just a little?

Ventilation and light in the smith shop are being considered as never before; the lavatory, sanitation, and all the conveniences of the hotel have been added, thus inviting tidiness and affording the opportunity for the mechanic to elevate himself and his calling. The question is forcibly presented to us at this point: does the employe appreciate this beneficence and recognition given him by the employer? There never was a time when the endeavor of the employer to improve the workingman's working condition was as great as at the present time, and the one who will not see or acknowledge the benefactor's best efforts in his favor is an ingrate and should be relegated to the shop where the only consideration given is that of self and no one else.

Finally: Ideal shops are the product of ideal employers, and the natural sequence should be ideal employes. The component parts of the ideal foreman should be brains, common sense, experience and a large bunch of privileges.

An Elastic Heel Horseshoe.

The accompanying illustration shows a horseshoe invented and patented by Mr. James E. Dolan, a reader of THE AMERICAN BLACKSMITH.

The shoe is similar to an ordinary horseshoe except that it has an opening or split in the heel in which is placed a piece of solid rubber. The illustration shows the shoe complete and also the heel of the shoe ready to receive the rubber wedge.

Mr. Dolan claims that the shoe will completely cure lameness and very materially lessen the severe jar to which a horse's foot is subjected on the hard roads and pavements.

The Repairing of Springs.

FRANK ANDERSON.

In regard to wagon repairing, I think there is no one thing that comes oftener to the wagon-builder for repair than springs with broken leaves.

I have read many articles on the repairing and welding of springs, and have found that many of them could be improved. Of course, any smith can weld a spring, but will it stand work and not break again in the same place?

In my method of repairing a spring I

proceed as follows: Remove the parts of the spring to be mended and then point or scarf each broken end and split them up for about one and a half inches; this will make two lips on each piece. Now bend one lip on each end upward and the others downward, in such a way as to have the parts lock when put together. When you have them firmly locked and have hammered the joint slightly, place it in the fire, being sure you have a good, clean fire, sprinkle well with borax and iron filings, and then weld.

This method will make a stronger weld than any other, but in working steel never upset it, for in doing so you break the grain and this weakens it.

I have mended a great many springs in this way and have never known of one to break in the weld.

A Number of Kinks for the Locomotive Smith.

O. C. H.

Here are a few kinks that will not be new to all smiths, but will be to some of the younger ones.

To make a brake-hanger-clip, take a piece of $\frac{3}{4}$ -inch stock, four inches wide and 12 inches long and bend it as shown in the engraving, Fig. 1, A. Now take two pieces each $\frac{3}{4}$ by 4 by 5 inches and after fullering the piece A at F, F, weld one of the pieces on each side of A as shown at B. Now punch holes and

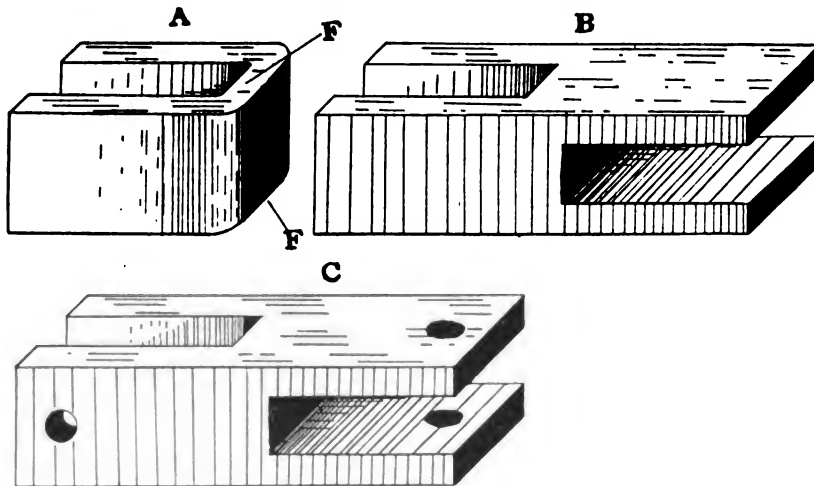


Fig. 1.—VARIOUS STEPS IN THE MAKING OF A BRAKE-HANGER-CLIP.

your clip is finished and should look like C, in the engraving.

To make a brake hanger, take a piece of stock 1 by 4 by 24 inches and punch three holes in this plate as shown at A, Fig. 2. Then cut from one inch stock two pieces like D, 4 by 5 inches and four pieces like E, 3 by 3 inches, punching holes in each piece the same size as those in the plate A. Now rivet these pieces on the large plate, placing one of the square cornered pieces, D, on each

side of the plate at the middle hole and the other pieces on each side of the end holes. Before riveting, be sure the holes in each piece are straight and true. Now weld the six pieces onto the plate with a slow heat, then fillet and shape as shown at B and C.

Having a great many brake-beam stubs to weld, we proceeded in the following manner: The stub we find is broken off at A, Fig. 3, so we cut a V in the end of the beam, B, and shape the stub as at C. Now weld up in the fire and swage down to the size wanted. In welding you will upset all and more stock than you weld.

To make a valve yoke, proceed as follows: Determine the size you want the yoke and then cut and shape pieces as shown in Fig. 4, A, B, C, D, E. Then weld them as shown in the finished yoke F. This method cannot be recommended as representing the best practice however.

To make a connecting strap, take two pieces of iron of the desired size and shape as shown at A and B, Fig. 5. Be sure to have plenty of stock in the ends. Now weld and draw out as at C and D. Then fuller the end and shape it as at E in Fig. 5.

To make a rocker arm, take a good pile of scrap, draw it out round and fuller it as shown at A and B, Fig. 6.

Of course, it would not be practical nor convenient to feed this sticky material in its natural liquid state, and it is usually diluted with water and then sprinkled on dry feed, or it is mixed with some material which will absorb it, although the government station in Louisiana, where molasses has been fed to the mules for the past eight or ten years, allows the animals to partake of

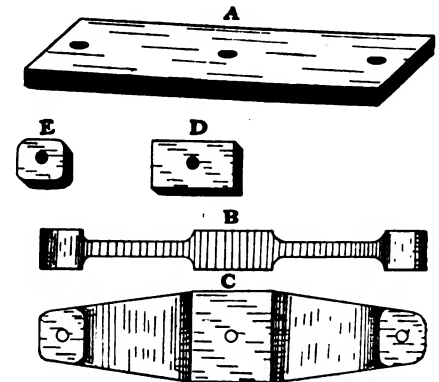


Fig. 2.—AN EASY METHOD OF MAKING A BRAKE HANGER.

the sweet as often as they wish, and it is fed to them from a large trough in its natural state.

The army horses in Porto Rico, during the late campaign on that island, were fed molasses diluted with water and sprinkled over chopped hay and, according to the government reports, the condition of the animals improved and a daily ration of about 35 pounds of grass and from 13 to 15 pounds of molasses was sufficient, for every 1,000 pounds of live weight, to keep the animal in good condition.

Tests in this country and elsewhere have been favorable to the use of molasses as a horse food, and the results of these tests safely warrant its use, not only on account of its nutritive value, but as an appetizer as well.

For feeding the molasses to the average horse the following is given: Five pounds of cut hay; two quarts of corn meal and four quarts of bran. Mix these three ingredients and then add, very slowly, one quart of molasses diluted in three quarts of water and mix the whole very thoroughly. This mixture may be given to the horse two or three times a day, and has been found to be a full meal for an animal weighing twelve hundred pounds.

Many horses refuse this food for a day or two, but if nothing else is fed for awhile, they will soon learn to like it, and will, in most cases, prefer it to the very best of oats, after being fed on it regularly for a short time.

It has been noted in all tests that

Now draw out A and B as shown at C and D. Then bend the bar and shape it to size as at E in Fig. 6.

Molasses as a Food For Horses.

Molasses, as a food for horses, was used as early as 1830, and has lately attracted considerable attention in this connection, experiments having been carried on for some time and resulting in the prominent veterinarians of the country recommending the substance very highly as a horse food.

molasses has some disadvantages, namely, it attracts flies and ants, sticks to the animal's coat and causes some little trouble in mixing it with other feeds.

Pointers for the Country Wagon Painter.

P. O. VAN.

One of the requisites of perfect surfacing is to keep the surface to be painted absolutely clean and free from dust, dirt and particles of foreign matter,

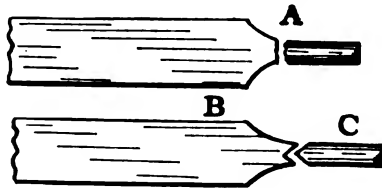


FIG. 3

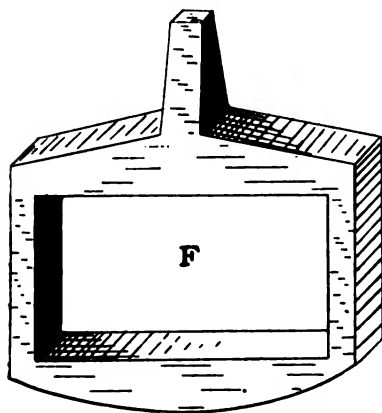
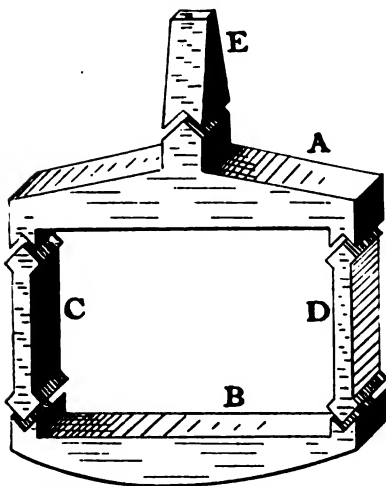


FIG. 4

Fig. 3.—SHOWS METHOD OF WELDING BRAKE-BEAM STUBS. Fig. 4.—METHOD OF MAKING A VALVE YOKE.

special care being taken in this respect, just before applying the finishing coat.

A little kink, probably not known generally among the country shop painters, will be useful at this stage of the painting job and consists of applying a small quantity of oil or varnish to the tips of the duster before dusting the surface preparatory to varnishing. A convenient way of doing this is to pour a small quantity of linseed oil or varnish

into the palm of the hand and lightly brush over it with the duster. The duster treated in this manner will remove all the particles of dust and dirt, much of which would otherwise be disturbed, only to fall back again upon the surface to be painted.

To get the best results the painter must bear in mind to have the varnish and the surface as near a temperature as possible and have the varnishing room as near a temperature of 75 degrees as possible.

Another point of value in applying varnish is to apply it, when possible, on bright days only, as varnish applied on dark or cloudy days will not have the finish and gloss which results from a sunny-day job.

When you find that the helper or you yourself have forgotten to clean out a brush, and it has been lying about the shop until it is hard and more like a piece of rock than anything, place the brush into a quantity of coal oil in such a manner as to have the bristles well in the oil, but not touching the bottom of the receptacle. This can be done by suspending the brush by means of a cord and hook and allowing it to hang with bristles immersed in the can of oil.

Making and Fitting a Horseshoe.

F. J. B.

I called upon one of my neighboring smiths the other day and while waiting for him (he happened to be out), I watched his helper make and fit a shoe. Perhaps the man was taught this method or perhaps he knew better, but he didn't do it right. I said nothing, but I made up my mind to write an article for THE AMERICAN BLACKSMITH in the hope that he would see and profit by it.

In the first place the shoe this man used was too wide at the toe, and when he welded on the calk he took the shoe out of the fire and dug the toe of it into the cold sand which he used as a flux. He made several other mistakes, but these are sufficient to tell the reason for this article.

Having picked out the size of shoe desired for the animal about to be shod, we heat the toe of the shoe first and bend the heels slightly together. This allows for the spread which occurs when the toe calk is welded on. Now, after determining that the toe of the shoe is not too wide, we place it in the fire and while it is heating we take a calk of the right weight and size and bend it slightly, to conform with the curve at the toe. Now take your heated shoe and drive the calk on at the toe and replace the

shoe in the fire. When at the proper heat sprinkle your welding compound on the toe, but don't remove the shoe from the fire and dig the toe into the welding compound, for this will cool the metal and make the calk very rough looking. When the toe of the shoe is hot enough, give it a few good blows on the calk and draw it out. In doing this, hold the heels of the shoe well away

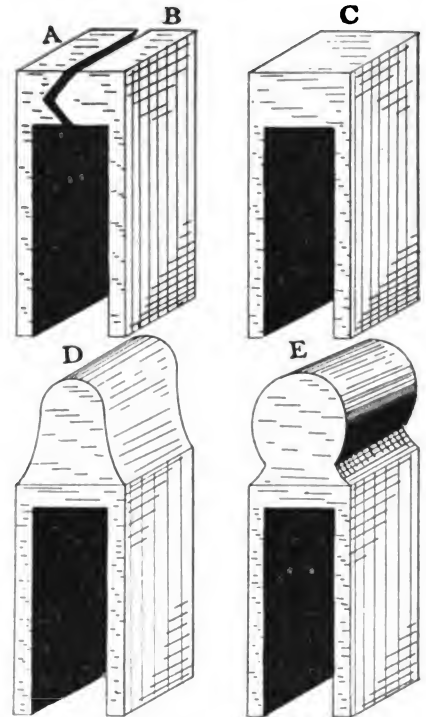


Fig. 5.—METHOD OF MAKING A CONNECTING STRAP.

from the side of the anvil, for in allowing the heels to touch the anvil, the toe calk will not be at right angles with the shoe, as it should be. Also do not draw out the calk too long, for the nearer the horse's foot is to the ground—to a certain extent—the better for the health of the horse and the foot.

Now punch the nail holes, punching from one side only, and that the upper

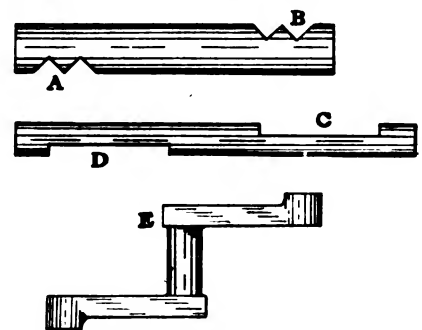


Fig. 6.—SHOWS METHOD OF MAKING A ROCKER ARM.

or hoof bearing side. Start at the holes next to the heels, and as you come to the holes at the toe this portion of the shoe will be cold enough so as not to injure or heat your punch.

The heel calks are very easy to turn, but this article will not be complete without a word on this part of the shoe. Heat the heels, and when hot enough, turn to the proper length on the edge of the anvil. Some smiths, generally the lazy ones, place the shoe in the vise and turn the heels in that way, but a careful shoer knows that the sharp edge of the vise jaw under the turned calk will cut the inside corner of the bend. The heel calks, as well as the calk at the toe, should be as short as possible, unless you are shoeing a horse with some defect in the foot.

In fitting the shoe be sure to give the frog plenty of room. Spread the heels out as far as possible. This gives the foot a firm bearing surface and the animal will have a comfortable shoe. Don't fit the shoe to the foot while too hot, but use a little judgment. There are advantages in hot fitting over the cold method, but when a smith will insist upon burning the shoe into the hoof, or fitting the shoe while too hot, he had better let horseshoeing alone.

A Badly Cracked Hoof.

W. O. JULIUS.

A subscriber asks what to do in the case of a horse having a bad toe crack, running from the hair to within one inch of the point or edge of the toe. He says a new growth of hoof has started above the fissure, but that has also commenced to crack.

The method of treatment to be carried out in this case is to first maintain the elasticity of the hoof by hoof-packing and ointments. The shoe for the diseased foot should be rather light than too heavy, and the nails driven not too near the heels.

The borders of cracks never grow together and the only thing to do is to prevent the crack from extending farther, by holding its edges with clamps or bands. Clamping is generally considered to be the best method of treatment and of preventing the edges from cracking farther, and several appliances and instruments for doing this are on the market, but our querist will find the following method equally as efficient: Drill a hole near the upper end of the fissure, commencing about a half inch from the edge of crack, and drill toward the crack. Then drill another hole on the other side of the crack in such a way as to meet the first hole at the crack and make one continuous hole from one side of the crack to the other. Now take a good, strong horse nail and bend slightly so it will conform with the hole and drive it quite

tight, clinching it snugly and drawing the crack together. Proceed in the same manner at the other end of the crack. The shoe that is to be put on the injured foot should have a clip on each side of the crack and a small depression should be cut in the bearing surface of the hoof just below the crack. This treatment supplemented by extra care of the foot will eventually grow a good, solid hoof.

Thrush In The Frog.

E. W. PERRIN.

Thrush is a disease of the sensitive frog, so common to horses that its significance as a cause of foot lameness is often overlooked by horsemen. The first appearance of thrush is marked by a fissure in the cleft of the horny frog which extends to the sensitive frog. This fissure or crack emits an offensive discharge which is so obnoxious in bad cases that you can smell it immediately on entering the stable.

Cause.

Thrush is caused by want of frog pressure. The natural function of the frog is to bear weight. In a natural state, the frog touches the ground—it is about even with the heels, see Fig. 1—in which case it performs its natural function—weight bearing—and shares, with the other parts of the foot, the weight of the animal. But in the domestic state, the horse being shod with a rim of iron, it invariably raises the frog off the ground, thus depriving it of its natural function of weight bearing. Not only this, but the weight which the frog should bear is thus thrown very unnaturally upon the heels.

It is a law of nature that an organ long deprived of use becomes impaired and finally loses its function, hence the sensitive frog, which (in a healthy state) secretes the horny frog, being thus deprived of the natural stimulus of pressure, becomes impaired. The horn secreted under such conditions is lacking in these elements which impart to it

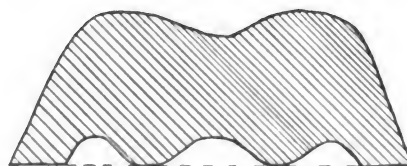


Fig. 1.—CROSS SECTION OF FOOT, SHOWING FROG LEVEL WITH THE HEELS.

its elastic properties and the frog thus becomes dry and hard and cracks in the cleft. As soon as the horny frog cracks, the sensitive frog is thus exposed to the irritant acids and other foreign matter contained in stable filth, and the sensitive frog being thus deprived of its

natural protection—the horny frog—is exposed to wounds from glass, nails, etc. The admittance of the irritating acids of stable filth greatly aggravates the trouble. The sensitive frog, which should secrete its horny covering, now grows scarcely any horn, and the frog, which in a healthy state thrives on pressure, is now so sensitive that any pressure will cause acute lameness. If the disease is unchecked, the frog will finally lose its function entirely; it slowly withers away, and as the disease progresses the aspect of the whole foot is changed, the frog diminishes in size and the heels close in upon it, causing the chronic condition seen in Fig. 2.

Treatment.

The treatment for thrush is a question of stable management and proper shoeing. In a few cases it may be necessary to get the assistance of a veterinary surgeon. First, don't be afraid to cut away all diseased horn and ragged fragments that would harbor dirt, then cleanse with hot water containing a little carbolic acid. The after treatment consists in keeping the parts clean and applying daily some antiseptic, such as iodoform, or solutions of chloride, sulphate of zinc, sulphate of copper or iron, about one in twenty parts of water; syringe some of the solution into the fissure. If the heels of the foot are contracted, soften the hoof by poulticing, then use one of Kelly's spiral spring hoof expanders. As soon as the antiseptic treatment establishes healthy action in the sensitive frog it will again grow a covering of horn and as soon as this is complete, the frog will again bear pressure. Shoe with a bar shoe that will get weight on the frog, and if the heels are higher than the frog, which is generally the case (for it is a fact that feet with high heels are much more prone to thrush than feet with low ones), then punch two rivet holes in the bar of the shoe, take a piece of rubber cut from an old rubber pad, cut it the proper shape and thickness and rivet it onto the bar of the shoe with a couple of copper rivets, so that the rubber will press, as in Fig. 3, on the frog. By these means you will obtain pressure, and as the frog develops, growing up to the level of the heels, the rubber may be left off. However, in some cases the heels are so high, owing to a short, upright pattern, that you can only obtain frog pressure by the continued use of bar shoes. But if the frog can be made to reach the ground with the ordinary shoe, the bar shoe is unnecessary. The bar of the shoe should be made broad,

so as not to cut into the frog. It must be remembered that a very important part of the treatment is keeping the part free from the contamination of stable filth, for if you allow the horse

nails or nails that have sharp heads and which you have made for just this purpose. These nails will keep a horse from falling or slipping for at least a day and when the owner has more time he can call and have the horse shod with sharp shoes in the usual way.

The smith will understand that the ice-nails are only a temporary substitute for sharp calks and are not to be used except when a horse is wanted immediately and the roads are very icy and slippery.

I don't recommend this make-shift in preference to the shoes with removable calks, for in my estimation, nothing now on the market can compare with a

good set of shoes with removable calks. They are about the handiest contrivance ever put on a horse's foot.

Diseases of the Foot—Causes, Symptoms and Treatment—4.

W. O. JULIUS.

Quittor.

This disease is generally divided into four classes, it being more convenient to treat on it in this way, although the several divisions may originate from the one branch, simple quittor.

The causes of simple quittor, as you will find in most cases of quittor of any kind, are bruises or wounds of the coronet, but many times the disease develops without any known cause and it is found to be especially prolific in the fall of the year.

The symptoms of the disease are lameness lasting from one to four days, and then the appearance of a small tumor in the coronary region. The affected leg may now, within a few hours, become very much swollen and the lameness so intense as to cause the animal to refuse to use the diseased member at all.

The first thing to do in treating quittor and all other diseases, as has been said in these articles before, is to remove the cause or causes. Put the animal in a stall or pasture by itself and carefully wash the legs as often as necessary to keep them clean, as mud and dust may cause the disease, if left to dry and harden on the feet. If the tumor has commenced to suppurate, hasten the suppuration by poulticing with linseed meal, and if the tumor is very painful, carefully cut into it to relieve the pressure. Now place the foot for about half an hour into a warm bath and

then poultice it. After poulticing for two or three days, the wound should be dressed with remedies to stimulate the healing process. These are many and where the wound shows a tendency to heal slowly, they may be changed every few days to advantage.

The next form of quittor is known as sub-horny and is the most common form of the disease. It may also be caused by injuries and bruises and is usually made apparent by the animal's severe lameness. The tumor in this case is extremely sensitive and the foot very hot and painful. In a few days a spot will appear in the region of the tumor, which will soften and open and a thin, watery discharge will exude. The disease will now spread, and if not attended to properly will separate the hoof from the sensitive frog.

This form of quittor may be treated the same as the simple form and if attended to in time will usually succumb to the treatment advised.

Tendinous quittor is that form of the disease which involves, not only the skin and tissues, but also the tendons and ligaments. It may have its origin in simple quittor and is usually an advanced stage of the simple form.

In most cases of tendinous quittor, swellings or points will appear in the region of the coronet. These are soft and may be as many as six or seven in number and when they open they slowly discharge a thick, yellow and very ill-smelling matter.

If not attended to promptly the animal may lose the affected foot and treatment should therefore be directed to the saving of this member. Whenever openings appear, from which pus escapes, as much as possible should be

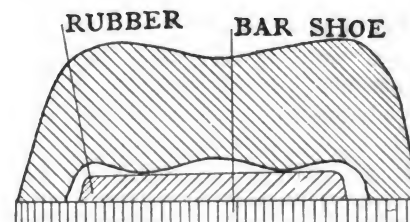


Fig. 8.—CROSS SECTION OF FOOT, SHOWING METHOD OF CAUSING PRESSURE ON THE FROG.

done to aid the escape of pus, and injections and pressure will aid very materially in this. The several openings should be probed and are usually found to lead toward the bottom of the foot. These should be opened at the sole so as to allow them to be readily cleaned and the pus to escape easily. When the discharge assumes a healthy state, injections of a strong carbolic solution



Fig. 2.—GROUND SURFACE OF NORMAL HOOF. VIEW OF CONTRACTED HOOF.

to stand in stable filth, the time spent in treatment will be thrown away. Of course, it is difficult to keep a horse's feet clean through the night, but stand him on a floor with good drainage and plenty of bedding, and after applying your antiseptic, tuck a little cotton saturated with a solution into the crack and leave it there until you apply the next treatment. Remember that thrush is the forerunner of many other complications of foot lameness, but because the disease is insidious in its approach, its significance is overlooked by the average horse owner.

A Hint for Sharpening Time.

ART. KIMBAL.

The time is not far distant when the smith will be expected to shoe and sharpen all his customers' horses at one time. When the streets and roads are icy and the horses can barely stand is the time the smith is busy from early morning until late at night.

Of course, the smith knows how to sharpen shoes for ice and snow, and it is not the purpose of this article to tell of any new or old way to do this, but I want to tell the smith how to do his work or at least regulate it so as to not be "rushed" in the morning and have nothing to do in the afternoon.

When you come to the shop on a morning when the roads are icy and traveling is rather hard for the horses you usually find a lot of teamsters and owners at the shop door waiting for you. Of course you take care of them as fast as you can, but still not fast enough for the customers. Now, you will find that some of the horses must be gotten out in double quick time. From these you will take the shoes and redrive with ice-

should be made, followed by the dressings directed in simple quittor.

The last form of quittor is known as cartilaginous and may commence as an inflammation of the lateral cartilage, but in most cases it appears as an advanced stage of either the simple or the sub-horny form. This form of quittor is usually serious and in many cases can only be cured by an operation, requiring a very thorough knowledge of surgery.

The symptoms of this disease are lameness and swelling on the side of the coronet over the quarter, the severity of the lameness depending upon the section of cartilage which is diseased. Finally fistulous openings appear in the tumor which forms on the coronet. The discharge from these is usually yellow, thin and watery, and is very ill smelling.

The treatment of this disease consists of the removal of all dead and diseased cartilage. This is usually effected by the injection of strong caustic solutions and in favorable cases this will affect a healing in two or three weeks, the discharge becoming healthy, diminishing and the diseased track finally closing up entirely.

If, however, the diseased parts show little or no tendency to heal after this treatment has been pursued for three weeks, the operation for the removal of the diseased cartilage must be resorted to. This can be safely undertaken by only an expert surgeon.

The next article in this series will deal with contracted heels, a most common trouble in which shoeing is the active curative agent.

(To be continued.)

The Value of a Square Toed Shoe.

V. J. B.

The ordinary shoe with the round toe, is to many horses, especially those rather unsteady in their gait, a very wobbly affair and causes them to throw their feet in an outward and forward direction instead of straight forward. The round toe also causes many horses to interfere and even stumble, which could be very easily overcome by shoeing with square toed shoes.

The smith can very easily see the value of a shoe with a square toe as it gives the horse a flat, even bearing point instead of a very unsteady bearing, as is the case with the round toe.

The square toe gives the horse confidence, steadies him and gives him a much better gait.

Many race horses and others used for speed are shod with square toes, as this style of shoe causes the horse to throw

his feet directly forward without the unnecessary outward motion.

The shoer will do well to try the square toe on the unsteady gaited and also interfering horses that he has to shoe, and it is safe to say he will be surprised with the good results.

In squaring the toe of the shoe the smith should consider the horse, his gait and what he wishes to overcome by this style of shoe. It may be necessary to flatten the toe but slightly, or to make a decidedly flat and even bearing surface at this point.

A Gas Engine in a General Blacksmith Shop.

SOUTHARD BROS.

I have worked ten years at wagon making and repairing, and in April, 1903, took my brother in as a partner. We bought a Weber 2½-horsepower gas engine, which we like very well. We put up one 20-foot shaft, one 12-foot, one 10-foot and several countershafts. We also put in a planer, a rip saw, a 20-inch band saw, a 10-foot wood lathe, a grind stone and five pumps. The engine we have in the basement, which has lots of light and is dry. On the ground floor we have an upright sand-belt machine, boring and spoke tenoning machine, both of our own make, and a Western Chief drill press, a Silver's power hub boring machine, an emery grinder, a blower and a trip hammer, also our wood benches, forge and blacksmith tools, including the tire shrinker, a heavy iron shears and many small tools. We also made another pulley and put it on the other side of the engine. This drives a 10-foot shaft, which runs a planer, a saw and a sand-paper drum. The other pulley drives a 20-foot shaft, a countershaft and several machines. We do not run them all at once, but we have plenty of power, except for planing and sawing, at which we could use a little more power. It does not cost much to run the drill press, band saw or lathes and other light machines, and we can do a job better in one-half the time we could by hand. We have a great variety of work and are kept busy most of the time, repairing and doing everything but shoeing. If a broken axle or pole comes in we start the engine, planer and saws, and in ten minutes it is ready to bore and finish. It takes away all our hard work, and the easy work of past years is the

hardest now. We do not have enough use for our hand saws and hand ax to keep them from rusting. We make all the pulleys ourselves. They are made of wood, split, and then faced in the wood lathes on a plug as they turn hubs. We also do custom sawing and planing, and at our spare time we make lumber wagons and bob sleighs; about six wagons and four to six pairs of bobs a year, with the aid of our machinery. We sell them at about what the factory wagons retail at, and we call them a great deal better. We do not cut prices, but rather advance them, and we get the work just the same, because the customers do not have to wait long, and another thing, we always have the work done. Some of our prices here are as follows:

Lumber wagon pole.....	\$ 1.75
Lumber wagon axle.....	2.50
Reach	\$1.00 to 1.50
Three-inch rims and tire cut down	15.00
Spokes.....	\$0.15 to .20
Setting tire, light.....	1.50
Setting tire, heavy.....	\$2.00 to 4.00
New buggy tires, per set.....	4.00
Buggy rims, per set.....	4.00
Shoeing prices here are..	\$0.50 to 1.00

A Well Equipped Shop of Illinois.

WILLET CREED.

The accompanying picture shows a view of the inside of my shop, the main building being 20 by 80 feet. I run two fires and do horseshoeing, general blacksmithing and rubber tire work. I have a four-horsepower gas engine, made by the Springfield (Ohio) Gas Engine Company, with which I run a 21-foot line shaft, a double emery wheel, a four-foot grind stone, a disc lathe and a drill. I grind plows and tools of almost every



AN ILLINOIS SHOP FOR GENERAL WORK.

description. My shop is well lighted by electricity, and every kind of grinding or drilling can be done neatly and with absolute safety at any hour of the day or night. I have had work requiring grinding come in that I would not

attempt or think of doing if I had no engine. The expense of running one is very light. I cannot see how smiths can do without it.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

Apply rubber tires tight so that they cannot creep on the channels.

Paint and color brushes, when not in use, should be kept in clean, soft water, suspended by the handle so as to immerse the bristles or hair completely.

One of the most successful smiths in town, employing many hands, makes a practice of never allowing a single job to go out of the shop without inspecting it himself. Now what has that to do with his getting on so unusually well?

In welding steel to iron, fork the iron and insert the steel. As the iron requires to be at a higher heat than the steel, insert it in the fire earlier. In very particular work, some smiths use separate fires, charcoal for the steel and coke for the iron.

When tempering mill picks, avoid hammering the edge or corner, especially after you start to flatten. Heat to a dull red, rub on a little cyanide of potassium, and plunge in rain water which has had the chill taken off of it. Draw the pick to a light straw color.

An Iowa smith sends as his remedy for clicking, to make the hind shoes thicker at the toes, thinning them gradually towards the heels. The toe or wall in front is not to be trimmed so much. The idea is to delay the hind feet in breaking over, thus allowing the front feet time to get out of the way.

Borax, to be used for welding, should first be melted, and then ground up. Give the following compound a trial: Borax, eight pounds; sal ammoniac, one pound; yellow prussiate of potash, one pound. Dissolve all together in water, and then evaporate them to dryness at a gentle heat, stirring constantly.

If there's any one thing more than another that needs care and coddling, surely it is varnish. Those who know recommend that work freshly varnished be placed in a darkened room till it sets, and then that all possible light be given it. A more rapid hardening, a deeper brilliancy, and a sharper lustre is claimed to result.

In general the forms of iron may be grouped by the amount of carbon contained. Wrought iron and machine steel have from one-hundredth to one-half per cent. of carbon, the two differing in grain and method of manufacture. Tool steel has from one-half to one and one-half per cent., and cast iron from two and one-half to four and one-half per cent. of carbon.

A horse owner calling recently, complained of shoeing bills from a certain smith who appears to have been in "caboots" with the liverymen caring for the rig. The liveryman billed the shoeing with the board bill, and the prices were made so high as to give each a little extra rake-off. Then, too, the horse was sent to be shod with suspicious frequency to swell the month's bill.

There has been a change and both have lost custom.

One of the cubs in the shop was recently given the job of removing the tires from some old wheels. The bolts were rusted fast, so that between trying to drive out the bolts or cutting them off with a cold chisel between fellow and tire, the rim of the first wheel had suffered badly before the boss came up. His way was to mark the center of the bolt head with a prick punch, drill down as far as the countersink and then knock out the bolt with a punch.

Some of the boys in the shop the other day were telling their plans for starting balky horses. One was to make the horse giddy by unhitching him and turning him around in a circle. Another was to bring his tail between his legs and tie it to the saddle girth by means of a piece of twine. Still another scheme was to put the hand over his nose so as to shut off his wind. It was also said that tying a string around his ear, close to his head, would start him. The object in all of the plans proposed was to divert his attention, because a horse cannot well think of two things at once.

At times we have occasion to use a black paint for iron work. Nothing we have yet found equals the following home-made preparation for general cheapness, goodness and blackness. We take twenty pounds of solid wood tar and bring it almost to the boiling point, keeping it at that temperature for nearly four hours. After the pot is taken from the fire and allowed to cool somewhat, the following mixture is stirred into the tar while it is still warm: Eleven quarts of oil of turpentine and 2½ pounds of lampblack. The addition of further turpentine will cause it to dry more rapidly.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

To Harden Axle-boxes.—Could some brother smith tell me if there is a way to case-harden ordinary cast-iron axle-boxes? I would like to know how. ENQUIRER.

Steam Drill—Tongue Box.—Will some brother craftsman tell me how to make a steam drill? I would also like to know how to make a box for a truck-tongue to set in. The box is to be of iron. THOMAS LONG.

Spoke Augers.—I wish to know what is the best spoke auger on the market. I have used a great many and they were not satisfactory. I am using one of the Standard tire setters and would also like to have the best auger. H. J. SUTTLE.

Welding a Step on a Nut.—I see a good many questions asked and answered through your paper and would like to have some brother smith tell me how to make a step, which is to go on an axle nut. Is the square plate made first and a straight shank welded on, or does the shank have to be bent? How do you keep the shank tight on the nut? J. C. S.

In Favor of Blowers.—In answer to Mr. Bernard Parsons regarding a blower, will say that a good blower is a time saver. We have used a bellows but would not give up our blower for the best bellows made. The blower we have now we have used for over three years and it is as good as when new. We find that we save about two hours' time with the blower. VELZY BROTHERS.

Another in Favor of Blowers.—In answer to Bernard Parsons regarding bellows vs. blowers, I will say that I have used a blower in my shop for about nine months and find it to be far superior to a bellows. I used a bellows for twenty-five years, was asked to try a blower and am glad I did. I expect to put in another blower in place of a bellows I am now using. Take my advice and get a blower. You will never regret it, for it is far ahead of a bellows. R. ALLCHIN.

Another Regarding the Anvil.—Mr. H. N. Pope did not try my advice regarding the anvil for if he did he would see the difference. I tried a chain some years ago but found that a weight does twice as much good. In regard to it being in the way, would say, that the only time I need the weight is when I sharpen plow lays. It can be pushed off very easily with the hammer when in the way. I would like to have some other smith try both and see which gives the best result. CARL BEREUTER.

The Best Tuyere Iron.—I have a question I would like to ask some of the readers of our paper. I have a shop with one fire. I do horseshoeing, light job work, also very heavy work, such as welding 2½-inch axles and ½ by 6-inch tires. What I wish to know is, what is the best kind of tuyere iron for me to have? I have tried the bird nest, the Sutton and a big ball fire. The ball does the best work, but uses much coal. I wish someone, who is doing the kind of work I do with one fire, would tell me. Give me your opinion, brothers. F. E. LEARNED.

Barcus Horse Stocks.—I noticed in the October number that Mr. S. S. Truitt inquired about horse stocks. I have had a Barcus horse stock in my shop over a year, and consider it the best invention for shoeing horses that was ever made. We have had horses in this stock that weighed over 1700 pounds, and they had to be shod, as they could not get away. Get a Barcus and you will have a stock that will not only hold them, but is easy to operate as well. I could not get along without it—or THE AMERICAN BLACKSMITH. It is the book of books. C. N. HOLZ.

Some Texas Prices.—I am sending you a few of our prices in this section of the country:

Horse shoeing.....	\$1.00
Tire setting, wagon.....	2.00
" " buggy	2.40
Wagon axle, 3-inch.....	3.00
Wagon tongue.....	2.50
Bolsters	1.50
Rims.....	\$1.80 to 2.10
Spokes, each .....	.15

My shop is 24 feet by 40 feet. I do general blacksmithing, wagon work and horseshoeing. F. E. LOWKE.

Bellows vs. Blowers.—In answer to Mr. Bernard Parsons' query in the November number of THE AMERICAN BLACKSMITH, I would like to say that I think the blower pays in more ways than one. Before I got my first blower I asked myself many times if it would pay me to take out a good bellows and put in a blower, but now you could not get me to use anything else.

The blower does not take up nearly as much room as my bellows did, and where I had the bellows, I now have a tool rack. The blower gives a steady blast and makes a much better fire. I also think that I burn less coal than I did with the bellows. If Mr.

Parsons will get a blower of a good make, he will never regret it. J. I. RANDALL.

Horse Stocks.—Mr. S. S. Truitt asks in the October issue about shoeing stocks. About two years ago I bought a set of shoeing stocks from George Barcus & Co. I could not get along without them; in fact, the other smiths in town have sent their bad kickers to my shop, and I never turn a mean horse away without having shod him properly. I recently had a very bad string-halted horse. He was gentle otherwise, but was so badly string-halted that he would not stand on three legs long enough to put the fourth shoe on him. I put the horse in my stocks and had no trouble in shoeing him. Of course, I never use the foot clamp on a horse of that kind, but a rope, and lift the foot only about eight to twelve inches off the floor. ERIC KUEHL.

Writing on Steel.—What method is used in writing on steel so as to make the writing permanent? H. D. KUHLMAN.

In Answer.—Cover the surface you wish to write upon with beeswax. Apply the wax warm so it will be evenly distributed when it cools. Then with a sharp instrument scratch through the wax onto the steel, being careful to make no unnecessary lines and to scratch down to the metal. Now fill the writing in the wax with the following mixture: Four ounces of nitric acid and one-half ounce of muriatic acid, being careful to fill each letter. When the acid has been on the steel about five or more minutes, according to the depth of writing desired, wash it off with water and remove the wax from the metal.

Be very careful not to get any of the acid on the hands or clothing. A feather will be found very handy for applying the acid on small work. W. B.

A Canadian Association.—An association has been formed by the blacksmiths in the vicinity of New Lowell and Creemore, Ontario. The first meeting was held in Creemore in August to consider a new scale of prices to take effect October 1st. The prices agreed on are as follows:

Four new shoes (cash).....	\$ 1.25
Setting four shoes (cash)....	.50
Four new shoes (credit)....	1.40
Setting four shoes (credit)....	.60
Axle stubs, 1 inch.....	\$5.00
" " 1½ inches.....	6.00
" " 1¾ inches.....	7.00
Setting buggy tires.....	2.00
Buggy tires, new.....	6.00
Setting wagon tires, 3 inches.....	2.50
Wagon tires, 2 inches.....	8.00
" " 2½ ".....	9.00
" " 3 ".....	10.00
Shoeing sleigh, 2, 2½ by ½.....	5.00
" " 3 inches.....	6.00

The raised prices are benefitting the members considerably, though the farmers are much adverse to the same.

How to make a Triangle.—I have to make a triangle for a lodge and I don't know how to make it to obtain the best results. I would like to know whether to use spring or tool steel, and also what size stock to use. The triangle should be 24 inches on each side and is to be used as a call or bell instead of a horn. Kindly tell me how to obtain good results and give a diagram of the triangle. J. F. SMITH.

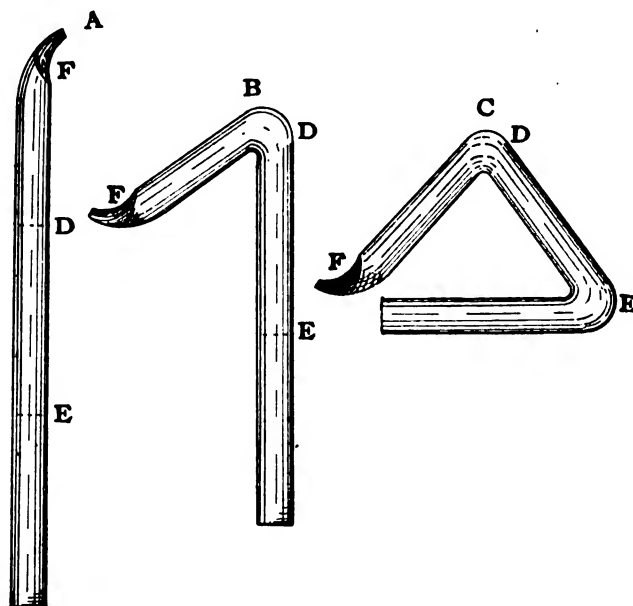
In Answer.—Take a round bar of spring steel six feet long and from ¾ to 1-inch in diameter. Mark it off into three sections as at A in the drawing, making the marks very slight with a center punch, not a cold chisel. Now heat one end of the bar and

forge it as at F, then heat the bar at the mark D and bend the top over as at B. Now heat at the second mark E and bend the lower part toward the forged end F, but not touching it. Now true your triangle until the base is horizontal and the other two sides form equal angles at each end of the base. To see if the piece is straight, place it on a perfectly level surface, and if all sides touch equally your job is finished.

In working your steel bar be careful not to overheat and burn it, and also not to work too cold. Be sure to have an opening at one corner of the triangle as shown in the engraving at C. W. B.

Cutting Rivets in Wheels.—If I had a customer, whom I wanted to do a mean job for, I would fill wheels for him as H. K. Van Tyne & Son said in the October paper. I have repaired a good many wheels that had a few spokes put in this way, and I always find them loose, but I never saw a wheel that was filled all around in this manner.

In order to put in spokes without removing the rivets, you not only have to cut a place for the rivet but you have to cut the spoke from the rivet to the shoulder in order



HOW TO MAKE A TRIANGLE.

to let the spoke pass the rivet. This leaves only a small bearing outside of the rivet (the only place the spokes touch each other) and they will soon work loose.

My way is to cut every other rivet, take out all the old spokes and then put in two spokes with no rivet between them, tying the spokes with a cord to hold them together until the glue sets. Continue in this way until each pair of mortises, not divided by a rivet, are filled. When the glue has set, bore holes and put in the rivets. Now cut the remainder of the old rivets and proceed in same manner as before, but putting in these last rivets after the tire has been put on the wheel.

I always cut out the rivets even if I have only one spoke to put in, and always cut the head of the rivet as it is much easier to cut than the riveted end. W. Otto gave a good way of filling Sarven wheels in the October number. D. M. LOVE.

Have We Got Yer Down?—This is only another way of saying "Have we your name as a subscriber?" It is the way in which Jakey goes after a subscription. Jakey is THE AMERICAN BLACKSMITH office boy, and a character he is. Confidentially, we attribute a great deal of our success to Jakey. Ever since he's been with us, which was

from the start, we have had our hands full taking in new subscriptions, so doesn't it follow that Jakey is a mascot? Jakey abhors idleness, so 'tween times he goes around town getting new subscribers. He always goes after his man with a smile, a wink, and "Have we got yer down?"

We started out to ask if you had sent in your subscription, when we got mixed up with Jakey, but we'll shelve him for the present. If you are not a subscriber we want your name down for THE AMERICAN BLACKSMITH, according to our readers, the best blacksmith paper published. It's not more than two feet from your nose now, so you can't miss it, and we are not asking you to sling a great big dollar into a bottomless pit. You get your money back, twice and thrice over.

If you are a subscriber already, send us one new subscription before the year ends, and get your own subscription extended six months. You can do your neighbor smith a service, if you will, by calling his attention to THE AMERICAN BLACKSMITH. We will also pay you for getting up a club of five or more new subscriptions. We want your name down among the growing list of those who are sending us in the names of new subscribers.

THE AMERICAN BLACKSMITH will help you, interest you, entertain you. Have we got yer down?

An Interesting Letter from the Northwest.—When I started in business in this place, three years ago, I only had a few tools, and but little money, not over \$40, but with the help of your paper and honest work, I now have a large brick shop, 26 by 70 feet, with a full line of power tools.

When I came to this place there was but one shop. Horses were shod with new shoes at 80 cents per pair, and reset for 40 cents; shares of all sizes sharpened for 25 cents and pointed for 50 cents. I am giving the prices of the association which I started here.

Moose Mountain Blacksmiths' Association.

New horse shoes, per set...	\$2.00
Stud horses' shoes, per set...	4.00
Sleigh shoes, new, 2 by ½, each	1.05
Sleigh shoes, 2 by ¾, each	1.75
Cutter shoes, each.....	1.50
Setting wagon tires, 2-inch...	3.50
Setting wagon tires, 2½-inch.....	4.00
Repair work, per hour.....	.50
Setting buggy tires.....	4.00
Sharpening seeder shoes.....	.20
Sharpening seeder shoes, plugged....	.70
Sharpening seeder shoes, points sharpened.....	.10
Plow shares, laid or pointed.....	.60
Plow shares, sharpening 14-inch.....	.25
Plow shares, sharpening 16-inch.....	.30
New plow fins.....	.50
New plow fins sharpened.....	.15
New plow shares, 14-inch.....	4.00
New plow shares, 16-inch.....	5.00
All new plow shares, cash or note.	
Harrow teeth sharpened, per 100....	4.00
New harrow teeth.....	.20
Coulter plates, sharpened.....	.40
Disc harrow blades.....	.75

These prices are for cash. Credit prices are higher.

We also keep one another in touch with the "dead beat." Our association reaches about 80 miles along the railroad, and with the exception of three Tom Tardys, we are all in the union. Our stock costs us as follows: Iron, 4 cents per pound; steel, 8 cents; coal, \$17.00 per ton; shoes, 7 cents per pound, and horse nails, 19 cents per pound. GEO. LAWFORD.

SUPERIOR Horse Rasps

The Best Yet

Best High-grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim,
which gives the user the advantage of a long stroke,
— and at the same time a rasp of medium weight. —

ASK YOUR DEALER FOR THEM



THE FOWLER NAIL COMPANY, SOLE MANUFACTURERS, SEYMOUR, CONNECTICUT.

Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Nov. 19, 1904, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

1/4 in.. round or square; Iron, \$2.80; Steel, \$2.80	
5/8 in., " " " 2.40 " 2.40	
1/2 in., " " " 2.20 " 2.20	

Flats—Bar and Band.

1/4 x 1 in., Iron.....\$2.20; Steel.....\$2.20	
1/2 x 1 1/2 in., " " 2.10; " " 2.10	
5-16 x 1 1/2 in., " " 2.00; " " 2.00	

Norway and Swedish Iron.

1/4 in., round or square..... \$4.90	
3/8 in., " " 4.50	
1/2 in., " " 4.30	
3/4 x 1 in..... 4.80	
1/2 x 1 1/2 in..... 4.20	

Horseshoe Iron.

For No. 1 shoe, 3/8 x 1 1/2 in..... \$3.30	
For No. 2 shoe, 5/8 x 1 1/2 in..... 2.90	
For No. 3 shoe, 3/8 x 1 1/2 in..... 2.80	
For No. 4 shoe, 5/8 x 1 1/2 in..... 2.80	

Toe Calk Steel.

1/2 x 3/8 in. and larger..... \$3.00	
--------------------------------------	--

Spring Steel.

5/8 to 1 1/2 in. Rounds. Op. Hearth \$3.00, Crucible \$5.00	
1 1/4 to 6 in. by No. 4 gauge to 1/2 in. Flats " 8.00, " 5.00	

Carriage Bolts. (Net Price per Hundred).

1/4 x 2 in..... \$0.54	3/8 x 2 1/4 in..... \$0.82
5/8 x 2 1/2 in..... .68	5/8 x 3 in..... .96
3/4 x 3 in..... .62	3/4 x 6 in..... 1.81
5-16 x 2 in..... .65	3/4 x 4 in..... 1.70
5-16 x 3 in..... .75	3/4 x 6 in..... 2.10

PADDOCK-HAWLEY IRON CO.

Iron, Steel, Carriage and Heavy Hardware,
Trimings and Wood Material.

ST. LOUIS, MO.

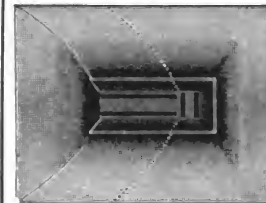
CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.



DEATH TO HEAVES
Guaranteed
Newton's Heave, Cough, Dis-
temper and Indigestion Cure.
A veterinary specific for wind,
throat and stomach troubles.
Strong recommends. \$1 per
can. Dealers, mail or Ex. paid.
Newton Horse Remedy Co.
(3) Toledo, Ohio.

\$500 SPECIAL PRICE



on the celebrated
Thompson Exten-
sion Tuyere Iron.
All your Tuyere

Iron troubles will
end if you have one
THOUSANDS IN
USE.

This Tuyere Iron and Fire Pots saves time, coal and money. It's no experiment. Can get a fire from a 2 to 14 inches long. GUARANTEED. sent on receipt of price. WHY NOT HAVE THE BEST? WILL PAY FOR ITSELF IN SHORT TIME.

THOMPSON TUYERE IRON CO.
2209 N. N. JERSEY ST., Indianapolis, Ind.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

FOR SALE—A good paying blacksmith and woodworking shop, including business and building. For particulars address

GEO. HUND, New Boston, Ill.

WANTED—A good horseshoer and general workman to take charge of forgework. A good chance for right party. A man of good habits preferred.

W. J. Sisson, Hastings, Iowa.

FOR SALE—Blacksmith, wagon, buggy, paint and trimming shop, all complete. Two good dwelling houses with two acres of land and good fruit. Address CHARLES GABLE, Agent, New Freedom, Pa.

I CAN SELL YOUR BLACKSMITHING BUSINESS (with or without real estate) no matter where it is or what it is worth. Send description, state price, and learn my wonderfully successful plan. W. M. OSTRANDER, 109 North American Bldg., Philadelphia.

Trade Literature and Notes.

GEO. BARCUS & COMPANY, of Wabash, Ind., report that in spite of their recent removal to new and enlarged quarters at Wabash, they have their hands full of orders. Full details and prices of their stock will be cheerfully sent to any one upon request.

CRAY BROS. of Cleveland, Ohio, desire us to remind the readers of THE AMERICAN BLACKSMITH that their special prize offer is still running and that they will be pleased to furnish, free upon request to any one, full details of how the prizes, an automobile, a gasoline engine and other articles may be competed for.

THE INTERNATIONAL JURY OF AWARDS at the Louisiana Purchase Exposition in St. Louis, have awarded Gold Medals to the Weber Gas and Gasoline Engine Company of Kansas City, Mo., on their Weber Gas Engines and Weber Suction Gas Producers. The Gold Medal is the highest award made by the International Jury.

ALL THE RIGHTS and ownership of 'Cherry Heat Welding Compound, formerly manufactured at Paterson, N. J., have been purchased by the Cortland Welding Compound Company, of Cortland, N. Y., and hereafter 'Cherry Heat' will be made by the above company in connection with their well-known brands of Boraxette and Climax Welding Compound.

COLUMBIAN HARDWARE COMPANY of Cleveland, Ohio, report a large demand for their Columbian All-Steel Anvils. They state that this anvil is built of special ingot steel in a plant of unusual perfection, and that blacksmiths will find great inspiration from its use. With every anvil goes their written guarantee. Further details may be had upon request to the above firm.

THE CORTLAND SPECIALTY COMPANY, Cortland, N. Y., at the present time are calling attention to their toe calk compound, which they claim to be the best welding flux for this purpose. This company has made a special study of the science of welding compounds and believe in making a special compound for each particular kind of work. Toe calk compound is one of their numerous varieties and a sample will be sent free upon request to any address.

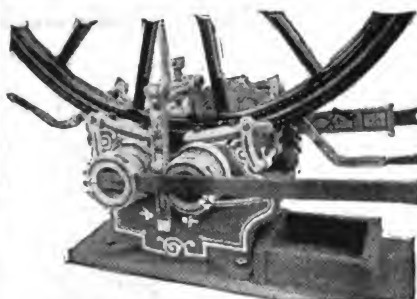
EVERY BLACKSMITH, wagon maker and repair man should have in his possession a copy of the catalogue issued by the Beaver Manufacturing Company, of Milwaukee, Wis., fully illustrating and describing their Reliance Gas and Gasoline Engines. The illustrations in this catalogue are exceedingly handsome and full descriptions of the machine are also given, together with numerous testimonials from satisfied users. In writing for the catalogue please mention THE AMERICAN BLACKSMITH.

HORSE CLIPPING for a long time was confined to liverymen and others who got their living out of horses they kept and who were more interested perhaps than others in doing everything possible for their health. The livery horses are now but a small percentage of those clipped, for practically all horses in use in this country have their hair removed either in the fall or spring. Even farm horses are now clipped to a very large extent.

At this season of the year more, perhaps, than any other a horse is liable to colds and pneumonia, brought about by standing around with a long heavy damp coat of hair. When clipped they dry out as fast as the perspiration is excreted and the animal is really warmer than he would be should he have on a long coat and that wet with sweat.

Very few stables are now without a clipping machine and the operation that used to cost a horseowner several dollars can now be performed by a stable hand in less than an hour's time. Formerly a good machine cost from \$35 to \$50, but one company, the Chicago Flexible Shaft Co. of 186 Ontario street, Chicago, realizing the demand for a good machine at a popular price, not only brought prices down to a fraction of what they were, but they actually improved the machines at the same time, and today offer a machine for \$10.75, which could not have been produced for many times that years ago.

They offer to send their handsomely illustrated catalogue to any address free on request.



DID YOU NOT LOSE SOMETHING

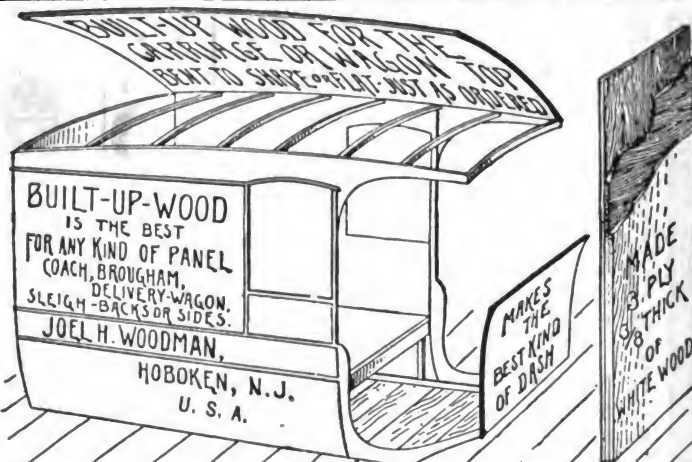
By not having a Cold Tire Setter in your shop the past summer? Now is the time to get one in order to have it thoroughly introduced before the rush of another tire setting season. Be sure to order

THE BROOKS COLD TIRE SETTER

and thus get the best machine made for this work. It is complete in every detail for rapid and accurate operation.

We ship them on trial. Write for our descriptive circular which tells you why they are so successful and so profitable to purchasers.

The Brooks Tire Machine Co., 121 North Water St. Wichita, Kan.



THIS WRENCH IS MADE OF 50-POINT OPEN HEARTH DROP FORGED CARBON STEEL, JAWS WILL TAKE 1-4 TO 3-4 INCH PIPE.

PATENTED IN UNITED STATES, CANADA, FRANCE, GERMANY AND GREAT BRITAIN. PATENTS PENDING



Best Wrench Made For Automobiles Has More Uses Than Any Wrench Made

No. 200 Regular No. 400 same as No. 200 only full Nickel Plated

The dies in wrench for English and foreign trade, furnished with Whitworth style of thread, if wanted.

Manufactured by

THE HAWKEYE WRENCH CO., MARSHALLTOWN, IOWA, U. S. A.

Bob Runners and Cast Shoes

We are headquarters for both bob runners and cast shoes and have a large and complete stock of all different sizes. You had better anticipate your wants in this line and take advantage of stock on hand. It is almost impossible to get bob runners now, so think what it will be later!



5 feet 10 inches long over bend.

Bob Runners.

1 1/2 x 2 \$1.30 per set.
1 3/4 x 2 1.30 "
1 7/8 x 2 1.30 "
2 x 2 1.60 "
2 1/4 x 2 1.85 "
2 3/4 x 2 2.10 "
3 x 2 3.05 "

Mud Bob Runners.

3 x 2 \$1.55 per set.
4 x 2 2.10 "
5 x 2 2.40 "
6 x 2 2.55 "
8 x 2 2.90 "
In ordering give width first and depth last.

A complete stock on hand of all sizes above, ready to ship upon receipt of order.

If you haven't one of our catalogues, better let us send you one. It costs nothing and is a most valuable book. It teaches you how to save money on all purchases. Also ask for information with regard to our great prize offer. An order for bob runners or shoes will count.

GRAY BROTHERS, Cleveland, O.

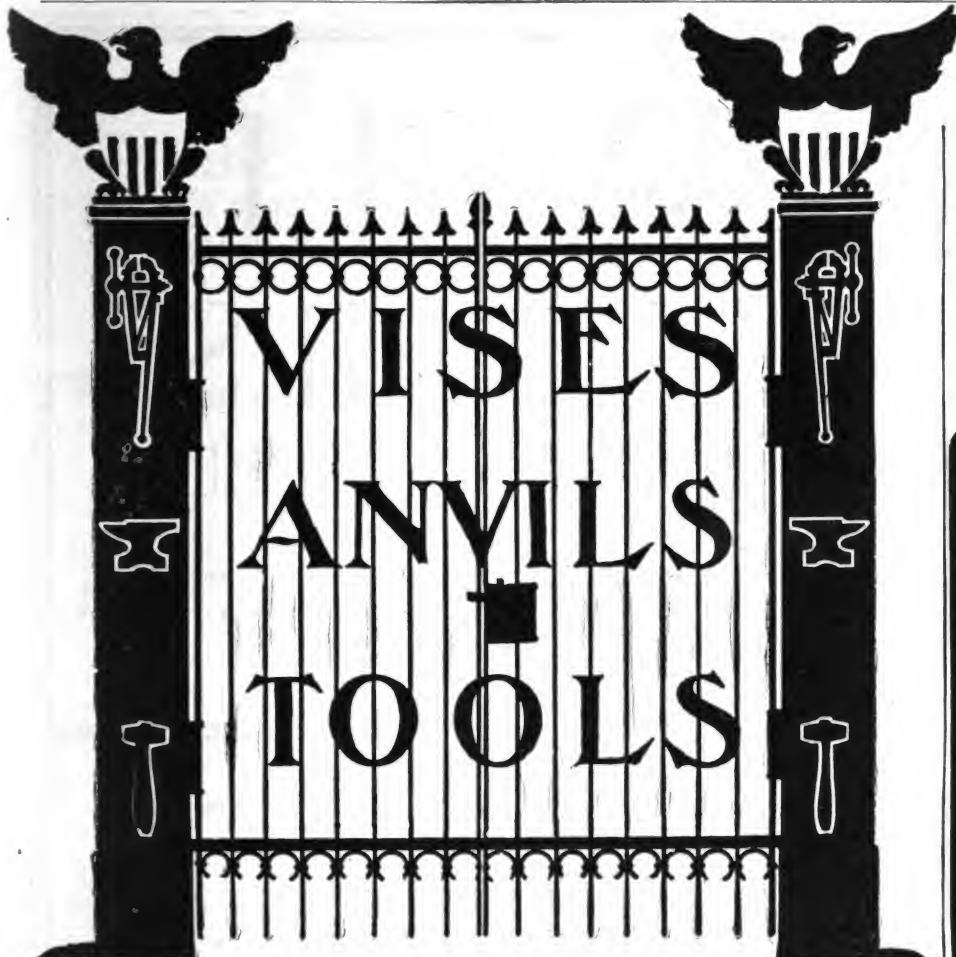
CAST SLED SHOES



Our bob runners are made of good quality oak, and guaranteed to please. Our bob shoes are cast iron and of excellent quality.

Below we give you a list of bob, also mud bob runners, besides a list representing our complete line of bob shoes. Prices you will find the lowest.

No.	Width (Top)	Width Bottom	Length	Thickness	Pattern	Price Per Set
55	1 1/2 in	1 in	36 in	1 3/4 in	Flanged	\$1.05
65	1 3/4 in	1 1/4 in	37 in	1 3/4 in	Flanged	1.46
75	1 7/8 in	1 1/2 in	37 in	1 3/4 in	Flanged	1.77
89	2 in	1 3/4 in	42 in	1 3/4 in	Flanged	2.05
127	2 1/4 in	1 3/4 in	37 in	1 3/4 in	Flanged	2.86
140	3 in	1 3/4 in	42 in	1 3/4 in	Flanged	3.17



Our Solid Box Wrought-Steel Blacksmith Vises have jaws forged from one piece of special ingot steel and faced with high-grade crucible tool steel. Blacksmiths say our horseshoer's vise is an indispensable tool. Write us about it.

EVERY VISE FULLY WARRANTED

Columbian All-Steel Anvils

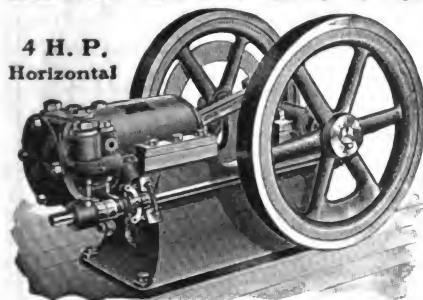
are made from special ingot steel. The greatest care and skill is employed in their construction. For long, hard service there are no better anvils made. Their clear ring is proof of highest quality and

OUR SIGNED GUARANTEE GOES WITH EACH ANVIL.

Our handsome catalogue of Vises, Anvils and other Tools ought to be in your hands. It's free, write for it.

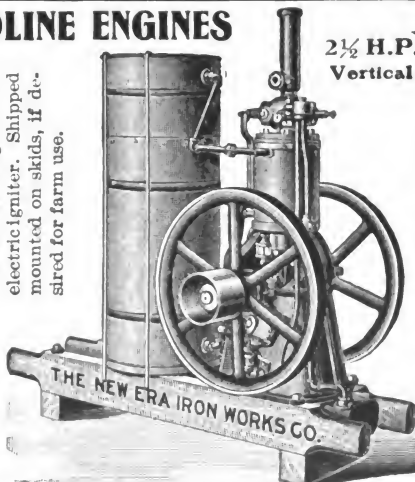
Columbian Hardware Co., Cleveland, O.

LITTLE GIANT GAS & GASOLINE ENGINES



4 H. P.
Horizontal

Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.



2½ H.P.
Vertical

Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.



Half a Man Half a Salary

The half-sized salary goes to the man who has but half developed his abilities. If you are earning but half what you need, we can qualify you for promotion in your present work or prepare you for a more congenial position and better salary. We are doing it right in your own district every day for others, to whom we can refer you.

The I. C. S. method of training by mail is the means by which thousands of ambitious people have been able to advance in salary and position. Many have risen from the lowest to the highest positions in their craft or calling. The accounts of the rise of some of our students read like romance.

Mark X before the position that interests you, fill in the coupon and send it to us. We will send full particulars.

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 1302, Scranton, Pa.

Please send me a free copy of "1001 Stories of Success," and explain how I can qualify for position before which I have marked X.

Mechanical Engineer	Bridge Engineer
Mechanical Draftsman	R. R. Construct'n Eng.
Machine Designer	Surveyor
Electrical Engineer	Mining Engineer
Municipal Engineer	Mine Superintendent
Chemist	Architect
Sheet-Metal Draftsman	Bookkeeper
Sanitary Engineer	Stenographer
Electrician	Ad Writer
Stationary Engineer	French } With
Marine Engineer	German } Edison
Civil Engineer	Spanish } Phonograph

Name _____ Age _____

St. & No. _____

City _____ State _____

Fac-Simile Letters

FOR
Circularizing and Follow Up Systems

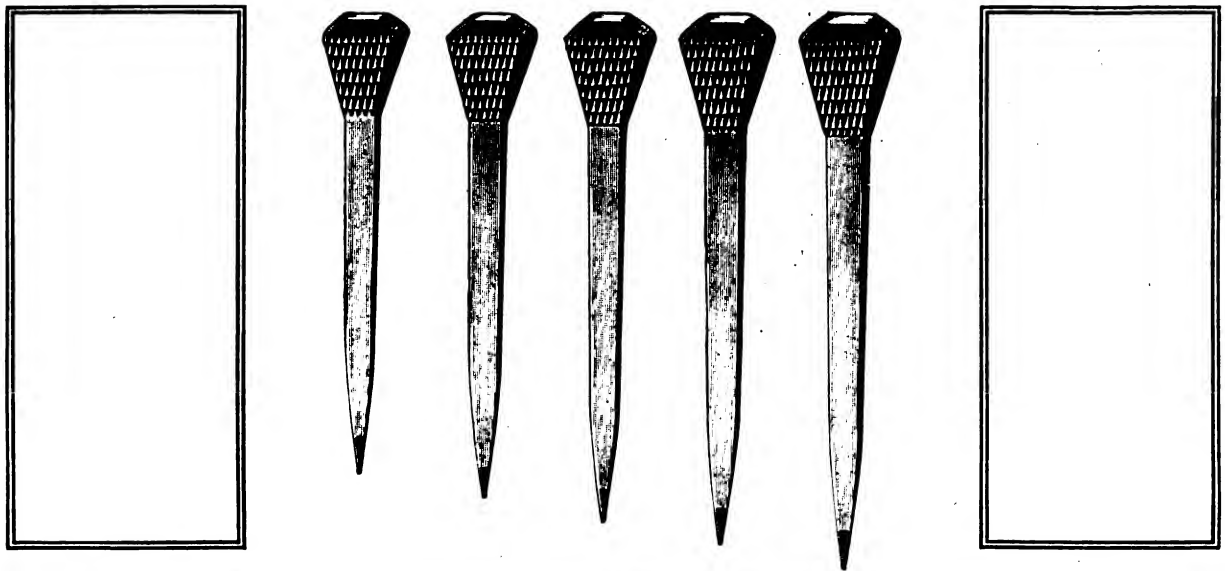
Look like the original and bring results. Furnished complete with names filled in or ribbons to match.

LERNER-BEAN CO.,
363 Washington St., BUFFALO, N. Y.

CAPEWELL HORSE NAILS ARE THE BEST IN THE WORLD

Drive the Best, Hold the Best, Safest to Use, Most
Perfect in Form and Finish

"GOOD ENOUGH PATTERN."



MADE BY
THE CAPEWELL HORSE NAIL COMPANY
— THE —

LARGEST MANUFACTURERS OF HORSE NAILS IN THE WORLD
FACTORY AND MAIN OFFICE, HARTFORD, CONNECTICUT

BRANCHES

NEW YORK: 103 Beekman Street

PHILADELPHIA: 323 Arch Street

BUFFALO: 11 Ellicott Street

BALTIMORE: 326 North Gay Street

CINCINNATI: 720 Main Street

DETROIT: 29-31 Farrar Street

CHICAGO: 238-240 Randolph Street

ST. LOUIS: 12-14 North 12th Street

NEW ORLEANS: 736 Union Street

DENVER: 1530 16th Street

SAN FRANCISCO: 636 Mission Street

PORTLAND, ORE.: 554 Worchester Block

ARE YOU IN LINE FOR A CALENDAR?

IF YOU ARE a regular reader of the American Blacksmith, see that your subscription is paid up to January. If it expires before then, be sure and renew **NOW** so as to get a copy of this calendar free.

IF YOU ARE NOT a regular reader of The American Blacksmith, send us \$1.00 for a year's subscription, and we will present you free with a copy of our 1905 calendar, and also give you the October and November issues free, so that you will have every number of this volume, beginning with the October issue.



The Calendar is 5½ x 10½ inches, lithographed in ten colors.

IF YOU WANT fifty of these calendars with your name on them to advertise your shop, you must order **AT ONCE** or you will be too late. This offer is good only to readers whose subscriptions are paid up to January. But you can pay your subscription, get fifty calendars and save money by taking advantage of offers (2), (3), or (4), as follows: (1), 50 calendars, postpaid, \$2.00; (2), 50 calendars and one year's subscription, \$2.75; (3), 50 calendars and 2 years' subscription, \$3.25; (4), 50 calendars and 4 years' subscription, \$4.00. Don't delay a day if you want fifty.

AMERICAN BLACKSMITH CO., BUFFALO, N. Y.

Weber Gas and Gasoline Engines are the Best

They have just been awarded a GOLD MEDAL by the St. Louis World's Fair

This is simply one more testimonial to the perfect construction and superior running qualities of the Weber Engines.

WEBER ENGINES are best because

only the very best material and workmanship go into them. They stand the test of long, severe service.

Every engine is rigidly tested before leaving the shop.

Anyone can operate a Weber Engine, they require but a few minutes' attention each day.

WEBER ENGINES ARE

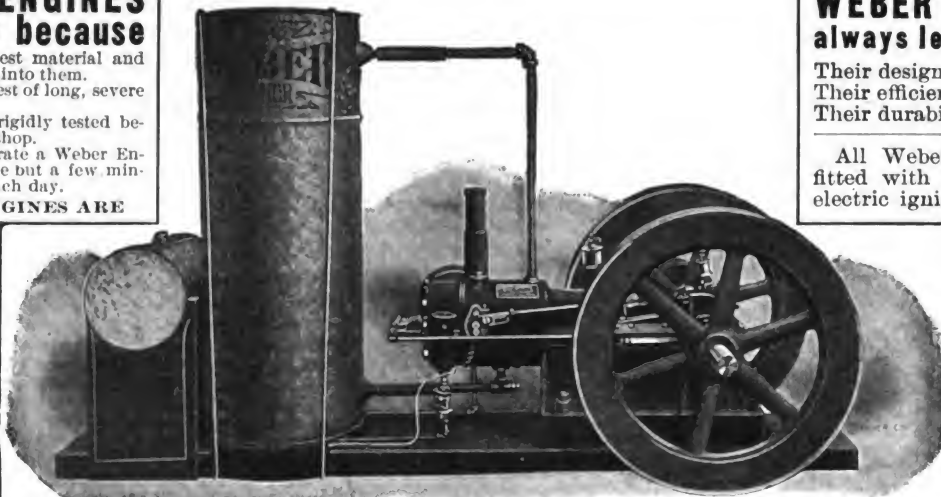
ABSOLUTELY SAFE

We build engines from $\frac{1}{2}$ up to 300 horsepower.

Twenty years' experience is back of Weber engines.

The Weber Junior is admitted to be the most popular engine for blacksmiths.

Over 8,000 now in use making money for their owners every day.



WEBER JUNIOR $2\frac{1}{2}$ H. P. Engine. It is shipped with all attachments complete, ready to run.

WEBER ENGINES always lead because

Their design is simplest. Their efficiency highest. Their durability greatest.

All Weber Engines are fitted with both tube and electric ignitor. All crank

shafts of solid billet steel. All parts easy of access and guaranteed interchangeable.

On all Weber Engines the speed can be regulated by the operator while the engine is in motion.

FUEL CONSUMPTION

is more important than the mere price of the engine

The fuel guarantee on Weber engines is lower than that made by any other responsible manufacturer

In actual service every engine we build will use less gasoline than we guarantee by ten per cent.

GUARANTEE

All Weber engines are guaranteed to be of the very best material and the very best workmanship, and we hereby agree to replace any part found defective f.o.b. our works without cost for a period of two years. We guarantee the consumption of fuel as noted below. We guarantee the speed to be steady and uniform. We guarantee that changes in temperature will not affect the engine's running. We guarantee interchangeability of parts. We guarantee that the Weber can be operated without constant regulation of the throttle valve.

Weber Engines operate on one-tenth of one gal. of gasoline per horsepower per hour.

Brandon, Texas.

Gentlemen:—Since putting in the Weber Junior engine more than a year ago, my business has more than doubled. Have added blacksmithing and a grist mill to my woodwork shop, and am running the following machines with the engine, any two or three (excepting the mill), at the same time.

Wood lathe; 16-inch circular saw; jig or bracket saw; grindstone; drill press; blower; grist mill, grinding 10 bushels of chop an hour.

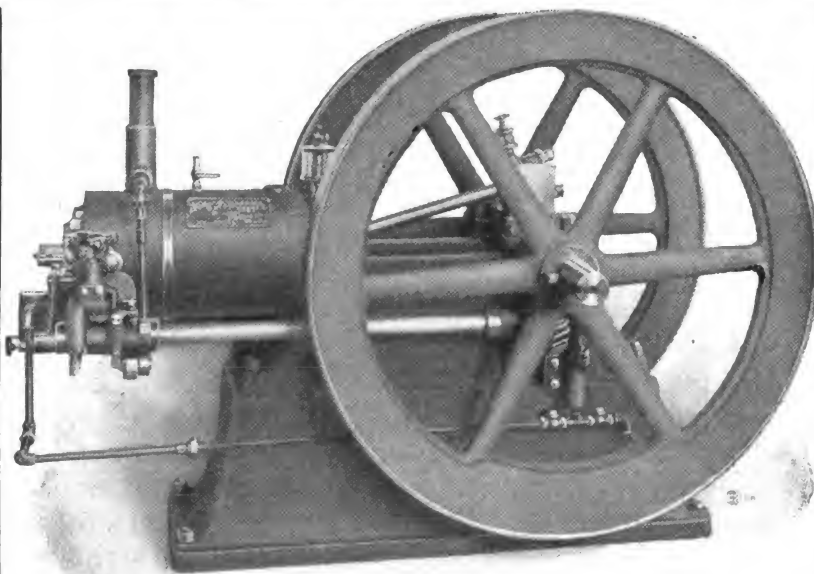
S. H. ALLRED.

Esto, Ky.

Gentlemen:—Have been waiting to give the Junior engine a trial before writing you. Have now had it in operation two months, running iron lathe, emery wheel, drill press and grindstone, and it has given entire satisfaction. Is always ready when I want power and is so simple that a boy of ten years could operate it successfully. It is economical in the use of gasoline, governs perfectly, and I would not sell it at any price if I could not get another. It has created quite a sensation in this community, and all who see it praise it. I selected the Weber Jr. from among a great many others and am satisfied that I made no mistake in my choice.

Yours truly,

W. A. HELM.



Five H. P. Weber Engine for blacksmith, wagon and repair shops.

Sinking Springs, O.

To whom it may concern:—I bought a Weber Jr. gasoline engine some months ago, and it is the best value for the money I have ever obtained. I am running a band saw, machine drill, rip saw, wood lathe, iron lathe, emery stand, feed mill and corn sheller. It seems to me that this little engine must pull at least 5 H. P. I can show anyone how to operate it in two minutes. I can see that my business has increased 30 per cent, since I put in power. I have seen several makes of engines, but none to compare with the Weber as an economical power. I hardly notice the cost and can afford to start up for a five-cent job. I believe my engine will more than pay for itself for the first six months; all I regret is that I did not purchase an engine sooner. I would not try to run a shop again without power; and anyone buying a Weber will be pleased with it.

Very truly yours,

J. S. OVERHULTZ.

WEBER GAS AND GASOLINE ENGINE CO.

New York Offices, 115 Liberty St., N. Y. C.

KANSAS CITY, MO.

P. O. Box V. 1114

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Any of these neat premiums will be given you free if you will get us one new subscriber to THE AMERICAN BLACKSMITH. Tell your brother smith how well you like the paper, and that he will get a calendar Extra if he orders NOW. Send us his dollar and get your choice of the premiums, **Which One Do You Want?** free and postpaid.

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American Blacksmith Co., Box 974, Buffalo, N. Y.

1. This hoof knife is made of refined crucible steel carefully tempered. It is a high-grade, serviceable knife, with Heller Bros. reputation back of it. Cut shows it about quarter size.



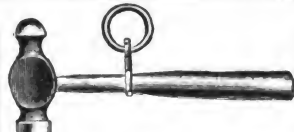
2. We offer as a premium a two line rubber stamp, with your name and address on it, accompanied with an inking pad, making a complete outfit. You will find use for it every day.



3. A handsome and reliable little pocket level like this would be of constant use to you. Nicely finished, $8\frac{1}{4}$ inches long.



4. This monkey wrench, in spite of being the size shown above, works just like a big wrench. The handle is of bone and the metal parts nickel-plated.



5. This miniature blacksmith hammer is neatly finished, and makes a splendid watch charm. Cut shows it full size.

The J. D. Hammer

Built especially for carriage and repair shops.

A Foot and Power Hammer Combined

AS A POWER HAMMER

All heavy work, such as welding stubs, heavy machine work and sharpening plows can be done on this hammer. Iron $8\frac{1}{4}$ inches square may be cut, or you can upset an iron 10 inches long, as hammer strikes the same blow 10 inches above the anvil as it does on the anvil. Strikes about 800 blows per minute.

AS A FOOT HAMMER

This hammer, may be instantly and easily changed from belt to foot power. For welding, rounding, flattening, swaging, cutting iron or any place you can use a helper, this hammer is always ready. It will strike as hard a blow with foot power as it will with the belt, only not quite as fast.

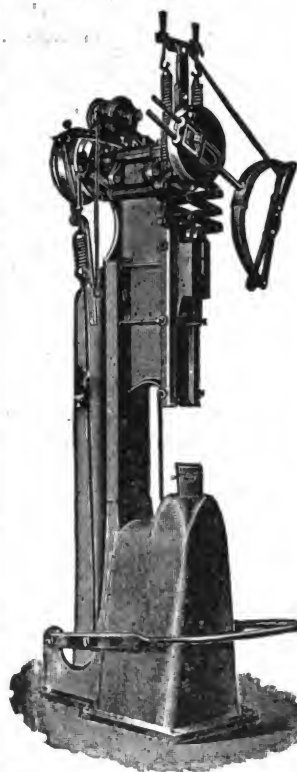
DO NOT BUY A HAMMER

that you can't get a stroke out of without starting an engine. The J. B. is the best all around hammer. None better for plow work. Twenty inches between dies when hammer is at highest point.

Any tools that are used on anvil can be used with this hammer. Shipping weight 1400 lbs.

Write for prices and full description.

Jinks & Davis
Morris, Kansas



For Christmas Presents

The most acceptable gift that you can make to any smith is a good book, well bound and filled with practical information about his craft. If the party you want to give the book to doesn't live in your town, send us his address and we will forward the book direct to him, saving you postage and trouble.

BOOKS

For Your Own Use

These long winter evenings are just the time for reading. The books listed below are written by well-known authorities and are filled with good practical, reliable information. Some, or all of them, ought to be in your library. Now is a good time to get them.

The American Steel Worker

BY E. R. MARKHAM.

This work is the acknowledged authority on the subject of steel working. It is written in a plain understandable way, and treats on the hardening, tempering and annealing of steel. Over 150 illustrations, 840 pages. Handsomely bound in grey art cloth. Price \$2.50.

A Text-Book on Horseshoeing

BY A. LUNGWITZ.

A very complete work on the anatomy of the horse. Contains chapters on interfering, forging, diseases of the foot, how to shoe diseased and healthy feet, etc. Over 100 illustrations and 170 pages. Handsomely bound in blue and gold. Price \$2.00.

Forge Practice

BY JOHN L. BACON.

A most valuable treatise upon forge work of all kinds. It is profusely illustrated and con-

tains chapters on welding, upsetting, drawing out, bending, metallurgy and calculation of stock, also tables and formulas. This is the best book of the year. It has over 250 pages and is bound very neatly in red cloth. Price \$1.50.

Practical Carriage and Wagon Painting

BY M. C. HILLICK.

A very complete treatise on the painting of vehicles, from a most delicate colored carriage to the rough and ready farm wagon. Recipes, formulas and mixtures. Full directions for every kind of vehicle painting. Fully illustrated and bound in red silk library cloth. Contains over 150 pages. Price \$1.00.

The Practical Gas Engineer

BY E. W. LONGNECKER, M. D.

A manual of practical gas and gasoline engine knowledge, covering errors to be avoided, and how to erect, run and care for an engine. It is

plainly written and tells you all about your engine. Contains over 140 pages and is neatly bound in green cloth. Price \$1.00.

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A well illustrated book on general blacksmithing work, shoeing, plow and tire work. Contains chapters on case hardening, babbiting, drilling and welding. Tells how to make butcher knives, hammers, chisels, plowshares, wrenches, etc. Contains over 200 pages and is handsomely bound in half-leather. Price \$1.00.

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Save all figuring, tell at a glance how much stock to use for oval or elliptical hoops of any size, the circumferences of circles, weight of flat, square and round stock, and the weight and strength of ropes and chains. Should be in every progressive smith's hands. Bound very neatly in green cloth. Price 50 cents.

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AMERICAN BLACKSMITH COMPANY

P. O. DRAWER 974

BUFFALO, N. Y.

New Books.

One of the most complete and interesting books on general blacksmithing processes which has come to our notice is the recent work of Mr. John L. Bacon entitled "Forge Practice." It is a book of 257 pages, bound in cloth, and copiously illustrated. Its scope will be seen by the headings of the various chapters, which are as follows: General Description of Forge and Tools. Welding. Calculation of Stock for Bent Shapes. Upsetting. Drawing Out and Bending. Simple Forged Work. Calculation of Stock. Making General Forgings. Steam Hammer Work. Duplicate Work. Metallurgy of Iron and Steel. Tool Steel Work. Tool Forging and Tempering. Miscellaneous Work. Tables.

This book is a publication of John Wiley & Son and can be supplied by them or THE AMERICAN BLACKSMITH COMPANY, at the cost of \$1.50.

Trade Literature and Notes.

UNIQUE AND UNUSUAL is the announcement on page X and XI of this issue by the Buffalo Forge Company, Buffalo, N. Y. They are offering to give away free one of their No. 66 or No. 68 Buffalo Drills, with automatic feed. Cut gears are employed in these drills, and the design, workmanship and material throughout are of the highest order. They are claimed to be superior machines in every respect for smith shop use. Full particulars of how these drills are being given away free will be found in their advertisements on pages mentioned.

HAHN is the name of the patent rubber-tread horseshoe, made by the Hahn Manufacturing Company of New York City. The makers claim that this shoe will positively prevent horses from slipping, and as it can be placed in the fire and heated the same as an ordinary shoe, it can be perfectly fitted to the horse's hoof. This shoe is equally suitable for light horses as well as heavy, and when given most severe tests, has been found to give entire satisfaction. Full particulars and prices regarding this shoe will be given free upon application to the manufacturers.



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Newton's Heave, Cough, Dis-
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H. W. COBB,

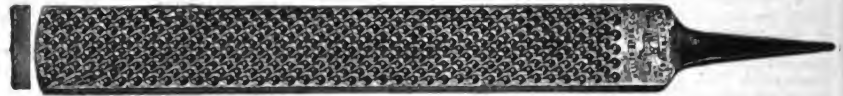
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\$85.00 Buys the Best Two Horse
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THE CHICAGO is guaranteed to develop full 2 H. P. In fact as much as most other 3 H. P. engines. Made in six sizes, 2, 3, 4, 6, 8 and 10 H. P. The Chicago is far superior to any other kind of power for the blacksmith because always ready for work. It can be started in a moment's time. It will make and save you more money than any machine you can put into your shop. Every up-to-date blacksmith should have one.

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ALL MATERIAL used is the very highest grade. Crank shaft is the best forged steel, turned, trued and polished. The steel connecting rod has take-up bearing and Phosphor bronze bushings. Ample provision is made to take up all wear. The castings are of the very best material.

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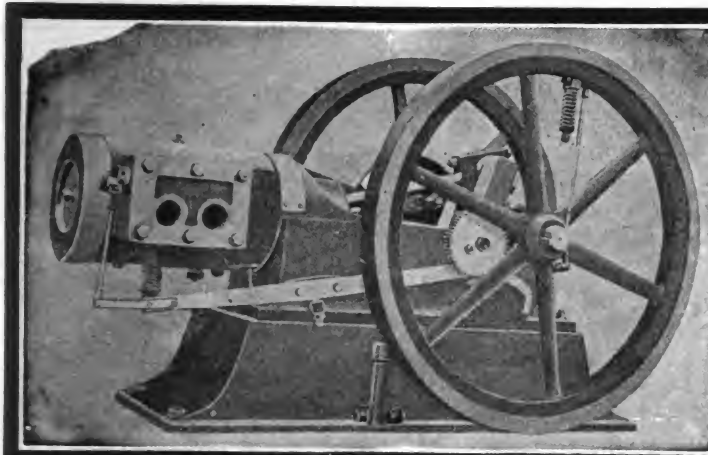


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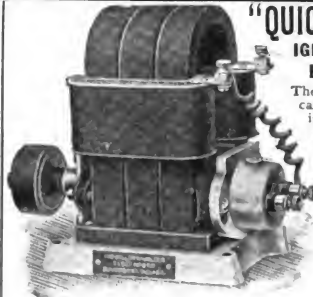
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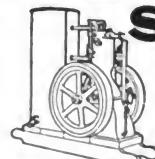
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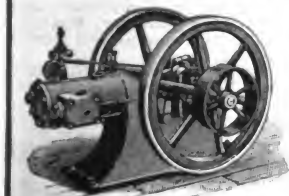
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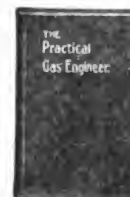
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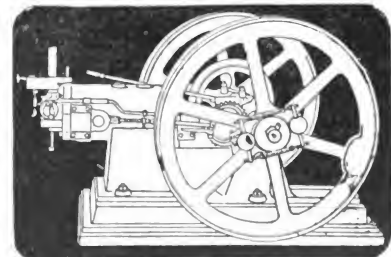
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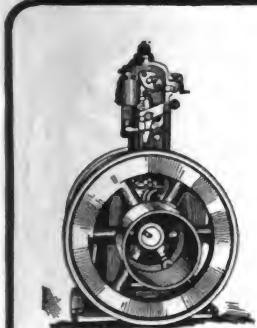
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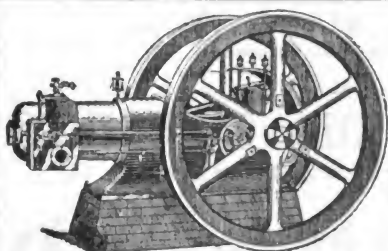
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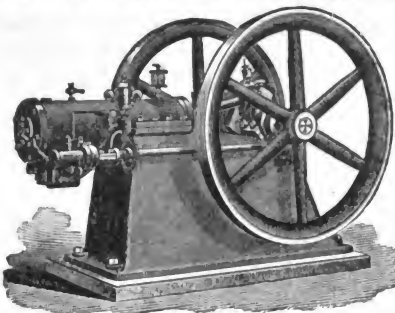
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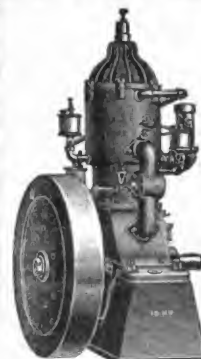
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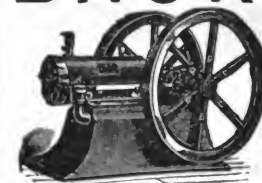
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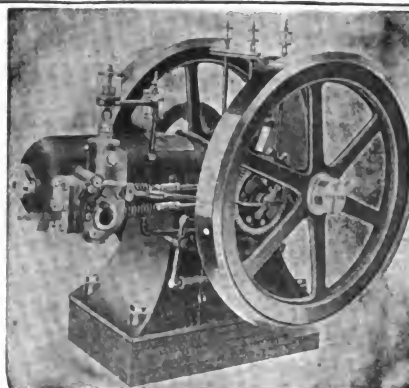
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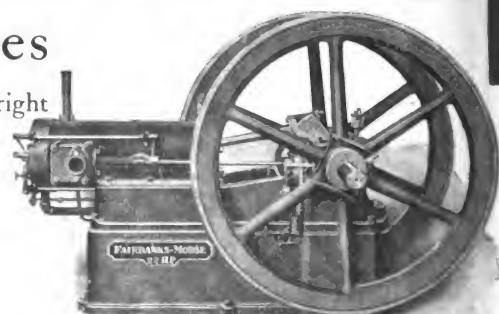
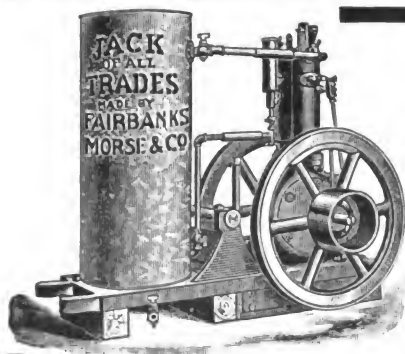
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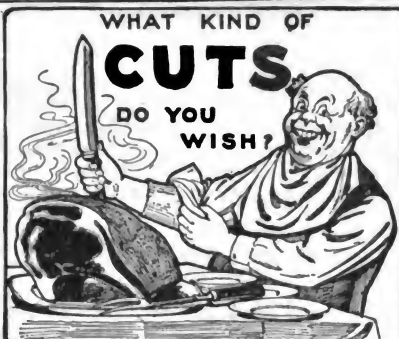


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BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

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Most Powerful Lever Punch and Shear Made.

100 lbs. on lever gives 25,000 lbs. pressure on punch. Always ready for work, and it does the business. Made in three sizes. No. 1 cuts iron $\frac{3}{4}$ " thick up to 8 inches wide and 1 inch round; it will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron. Weight, 500 lbs. No. 2 cuts iron 6x $\frac{1}{2}$ " and $\frac{3}{4}$ " round, punches $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron. Weight, 350 lbs. No. 3 cuts iron 6x $\frac{3}{4}$ " punches $\frac{1}{2}$ " hole in $\frac{1}{2}$ " iron. Weight, 250 lbs. Occupies a floor space when lever is up, 10x24 inches. It is simple in construction, there being only two pieces of casting in it. You can duplicate any part of it in your own blacksmith shop. We furnish with each machine five sets of punches and dies, any size, from 3-16 to $\frac{1}{4}$ ". There are two lower shears, one for round and one for flat iron. You will find use for it every day.

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A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

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Handy Farm Wagon
 THE BEST METAL WHEEL WAGON MADE.




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Pressed steel wheels, any height and width tire, interchangeable hubs. Gears of selected stock, thoroughly ironed. Made in several styles.

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See That Cushion?
It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



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**NO
LAMENESS
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CHEAPEST
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STEEL STAMPS
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We Manufacture
SHEARS
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PUNCHES

Hand or power, for
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 Send for Catalogue C.

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***STRONG,
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**OLDEST AND BEST
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Especially adapted to grinding ear corn,
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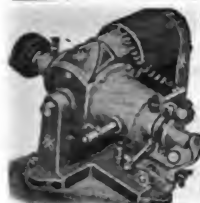
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will come to an end if you get the old reliable Universal brand.

Send for our free booklet with hints on the use of the hack saw.

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To Owners of Gasoline Engines, Automobiles, Launches, Etc.
The Auto-Sparker
does away entirely with all starting and running batteries, their annoyance and expense. No belt—no switch—no batteries. Can be attached to any engine now using batteries. Fully guaranteed.
Write for descriptive catalogue.
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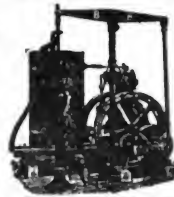
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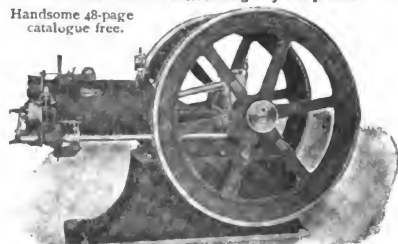


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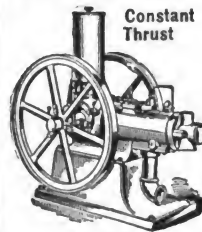
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Constant Thrust

STATIONARY and MARINE
1-60 H. P.

Adopted by the U. S. and Foreign Governments.

Most Economical and Safest Power known. Runs with common kerosene, distillate or fuel oils.

It will pay you to consult me before placing your order elsewhere. For Pumping, Electric Lighting, Charging Storage Batteries, and all other Power Purposes.

Highest award for Direct Coupled Engine and Dynamo, Paris Exposition, 1900.

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A. MIETZ, 128-138 Mott St., New York
Send for Catalogue, Dep. 34.

New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.

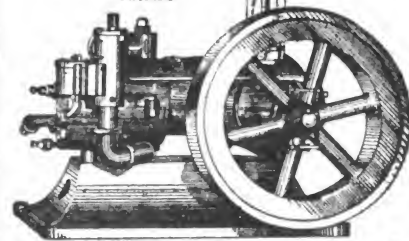


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Most Powerful Engine for its Size Ever Built

Also the Simplest Made



3 H. P. 21 INCHES LONG 150 POUNDS

There's value in our agency. One blacksmith sold three the first month.

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BECAUSE IT'S SO SIMPLE

The ELI Gasoline Engine is the **BEST** because it has no gears, cams, levers, or valve mechanism. **DON'T BE FOLDED** into buying a complicated engine that's always out of order—get the ELI—no trouble then. Now get busy, brother, and write for booklet to-day.



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THE ELI
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BAUER GASOLINE ENGINES..

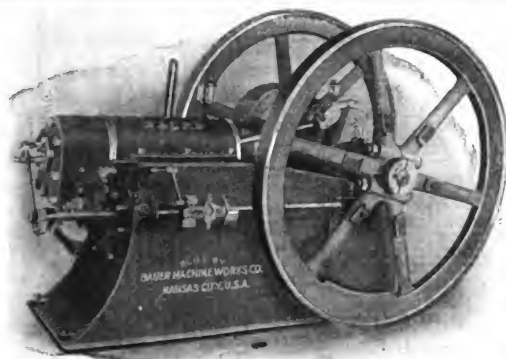
The Acme of Simplicity and Perfection.

If you will examine and compare, piece by piece, you will say there is no other quite so good as the "Bauer." All sizes from 1½ to 20 H.P. Write at once for free catalogue containing long list of letters from satisfied users. Our prices are also very interesting, considering quality.

THE FIRST BLACKSMITH in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily. The Bauer is the best.

Write us Today.

Bauer Machine Works Co.
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The accompanying cut represents

Guaranteed First-class In every respect.

The Baker Engine

Complete, Ready to Run.

It is cooled by water evaporation, the simplest and most desirable method for small engines. The cylinder cannot therefore become warmer than the boiling point, which is not too high for good lubrication. Air and oil-cooled engines often become so hot that they waste a large portion of their power in friction and work injury to themselves.

To prevent freezing it is only necessary to empty a small quantity of water.

No troublesome gasoline pump, and yet not a gravity feed. The gasoline is drawn up by the engine piston.

Electric ignition, and an extremely accurate governor located well out on the fly wheel.

Librally designed, perfect combustion, and high efficiency.

Best material and workmanship throughout.

Made in two sizes, 1½ and 3½ horse-power, by

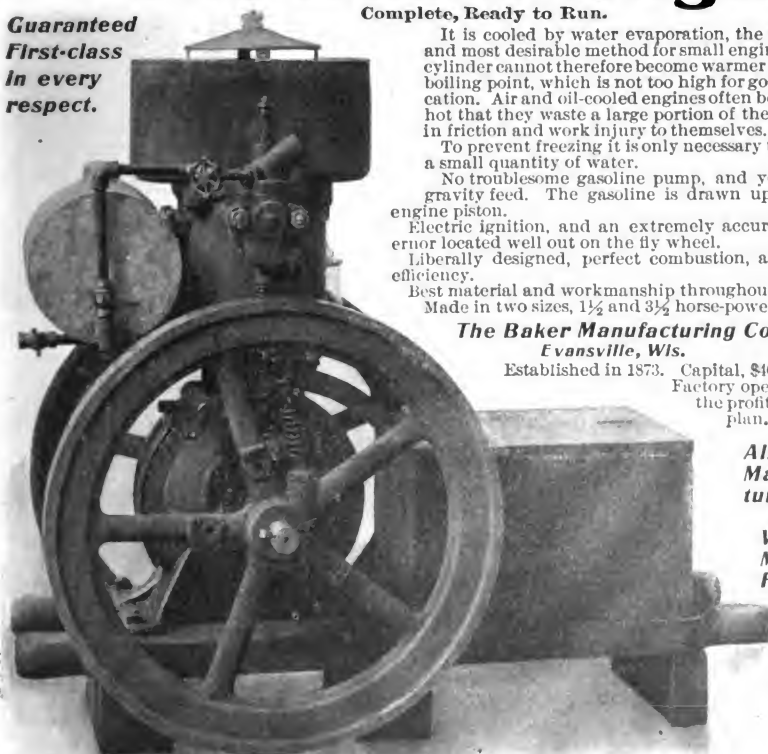
The Baker Manufacturing Co.
Evansville, Wis.

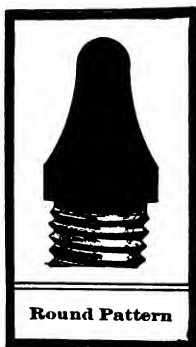
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Factory operated on the profit-sharing plan.

Also Manufacturers of

Wind Mills, Pumps, Tanks and Feed Grinders





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Are Made in Square and Round Patterns

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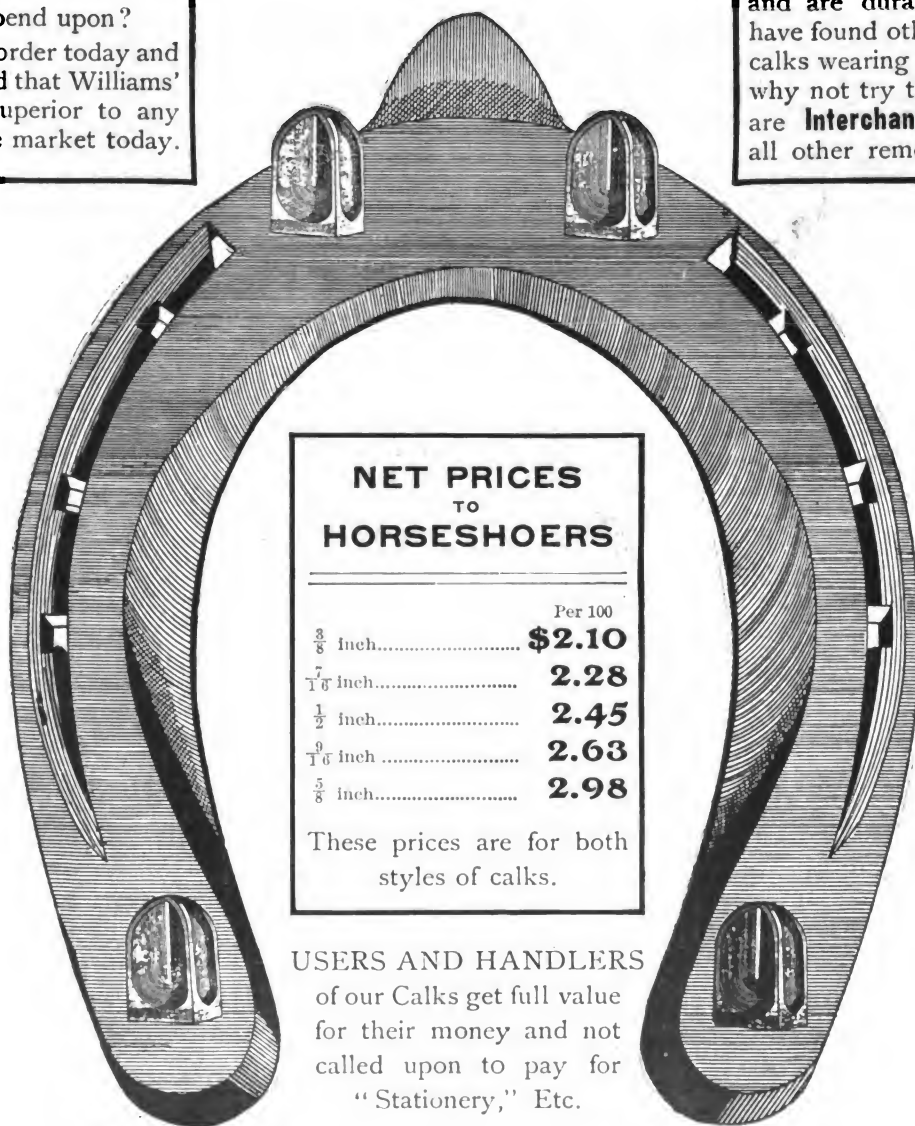
Why not use a Calk that you can depend upon?

Send us an order today and be convinced that Williams' Calks are superior to any Calk on the market today.

WE PROTECT THE
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WILLIAMS' CALKS

Are built for business and are durable. If you have found other makes of calks wearing out too fast, why not try them? They are **interchangeable** with all other removable calks.



NET PRICES TO HORSESHOERS

	Per 100
$\frac{3}{8}$ inch.....	\$2.10
$\frac{7}{16}$ inch.....	2.28
$\frac{1}{2}$ inch.....	2.45
$\frac{9}{16}$ inch.....	2.63
$\frac{5}{8}$ inch.....	2.98

These prices are for both styles of calks.

USERS AND HANDLERS of our Calks get full value for their money and not called upon to pay for "Stationery," Etc.

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BITTENBENDER & CO.,

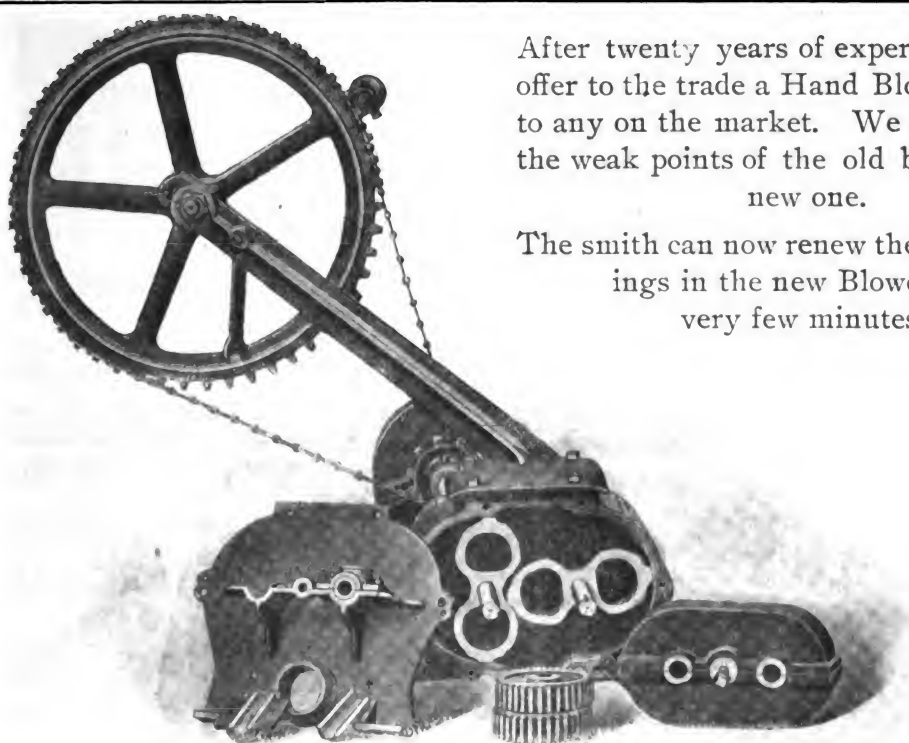
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126-128-130-132 Franklin Street, Scranton, Pa.

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Acme Hand Blower

For Blacksmiths



After twenty years of experience we now offer to the trade a Hand Blower superior to any on the market. We eliminate all the weak points of the old blower in our new one.

The smith can now renew the bronze bearings in the new Blower in a very few minutes.

Net price, with box and connecting pipe for tuyere, after November 15, 1904

\$15.50

Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
The Leader of Blowers for Blacksmiths.

P. H. & F. M. ROOTS CO.

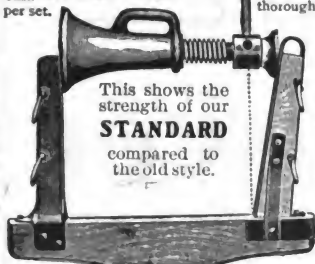
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The Bruce Malleable Wagon Standard

We make the following sizes:
 No. 1, 3 in. wide, 14 in. high
 " 2, 3 1/4 " 14 "
 " 3, 3 3/4 " 10 "
 Price, \$1.50 per set of 4 stks
 Cash with order. Weight, 16 lbs.
 per set.



This shows the
strength of our
STANDARD
compared to
the old style.

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented. Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

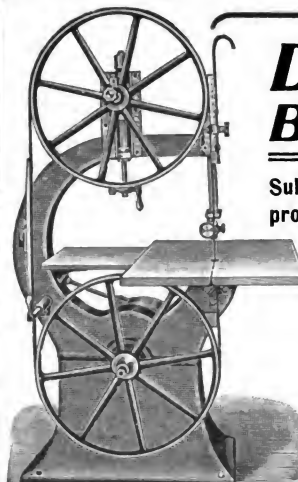
1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time straightening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1/2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. Harshbarger - - Bement, Ill.



DEFIANCE BAND SAWS

Substantial and durable. The latest improvements. Wheels furnished with cold-rolled spokes, far superior to a cast-spoke wheel. Unequalled for wagon, wood and repair shops.

**SIDNEY TOOL
COMPANY**

SIDNEY, ——— OHIO

Why do discriminating buyers invariably call for "Buffalo" goods—forges, blowers, punches and blacksmith tools?



The
Blacksmith's
Friends



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

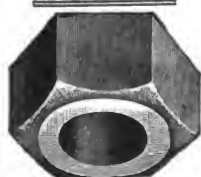
Welds at a low heat, does not fly. Saves time and fuel. **Guaranteed** to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the **Banner Brands**.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

SPECIFY



"MILTON"



THEY ALWAYS GIVE
SATISFACTION.
THE PRICE WILL
INTEREST YOU.

NUTS AND WASHERS

MANUFACTURED BY
THE MILTON MANUFACTURING CO.
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TOOLS For the HORSESHOER and BLACKSMITH

Is Our SPECIALTY

FREE—
a catalog and
hanger giv-
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which will
enable you to cut horseshoe molds to any weight without
waste.



Electric Sharpening Hammer

CHAMPION TOOL COMPANY,
 MEADVILLE, PA.

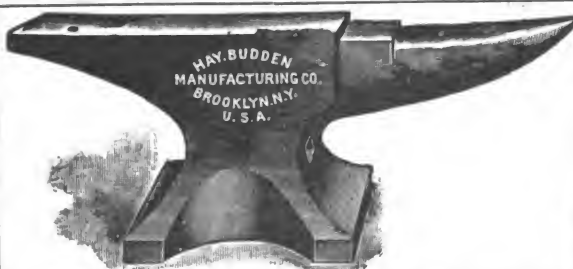
HAY-BUDDEN SOLID WROUGHT ANVILS

The Gold Medal Anvil
 Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

JANUARY, 1905

\$1.00 A YEAR
10¢ A COPY



Buffalo Portable Forge
No. 625
For Outdoor Work

See Our Special Offer
on page XXVII
A Buffalo Drill
FREE!

Buffalo Forges

No. 600 Series

The Very Latest

New in design; perfect in construction;
simple and solid; durable and efficient

The Very Best

not only because we say so, but

BECAUSE they are perfect

in design; up to date in every detail; backed by our broad guarantee and 27 years of experience; sold subject to free trial test in your own shop, and if not satisfactory, you need not buy.

On Every Forge

of the Buffalo No. 600 Series is attached our new high power No. 200 Hand Blower. It is of the very latest pattern and guaranteed to give a stronger blast with less exertion than any other blower made. See page xxvi for guarantee, full description and illustrations.



Buffalo No. 0G2 Forge



Buffalo No. 650 Forge



Buffalo No. 604 Forge. Built of steel plate

Any parts wearing out in five years, replaced free of charge.

Buffalo Forge
Company,
Buffalo, N. Y.

London Office, 39 Victoria St., S.W. London, England.

Carriage Maker and Blacksmith Tools

Special
Prices to
Carriage Makers
and Blacksmiths
if this paper
is mentioned.



Fig. 900, 12 inches.

Fig. 900, "Elite," Silver Blower (*patent applied for*) is distinctive in design, has cut gearing and removable, interchangeable bronze bearings for gear pinions. The gearing is self contained and attached to side of fan case, has an outer bearing plate over it and is thus permanently secured so that there is no unnecessary friction or lost power. The gear covering is removable without disturbing the gearing or paddle spider. There is a light tuyere for clay lining and a heavy one to use without lining. All parts are interchangeable.

Fig. 822, Band Saws are made in sizes 20 and 26 inch for foot or belt power and 32 and 36 inch for belt power. They are admirably adapted to factory and repair work of every kind.

Fig. 718, Spoke Tenon Machine cuts tenons $\frac{1}{4}$ to 2 inches diameter up to 6 inches long and also bores the felloe.

Fig. 709, Taper Hub Boxing Machine is made as illustrated, on legs and also without legs to mount on bench. It bores tapering holes in the hubs for the boxes and cuts the recesses for nuts and collars. Made also for hand and power.

Also Forges, and a complete line of Hand and Power Drills.

Manufactured by

— THE —
SILVER MFG. CO.,

365 Broadway,

SALEM, OHIO.

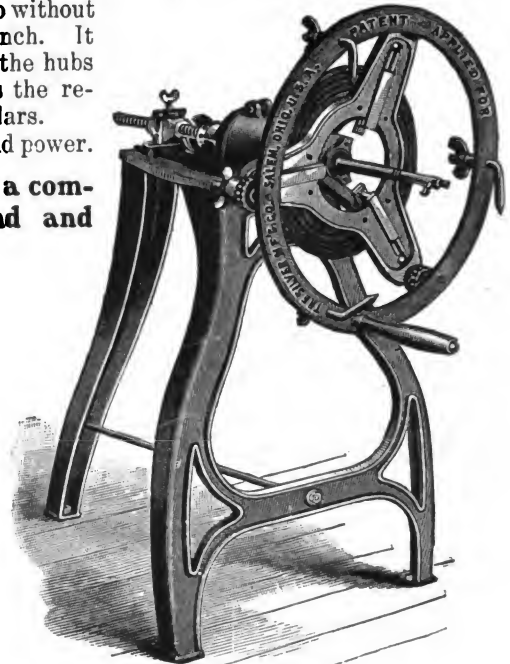


Fig. 709.

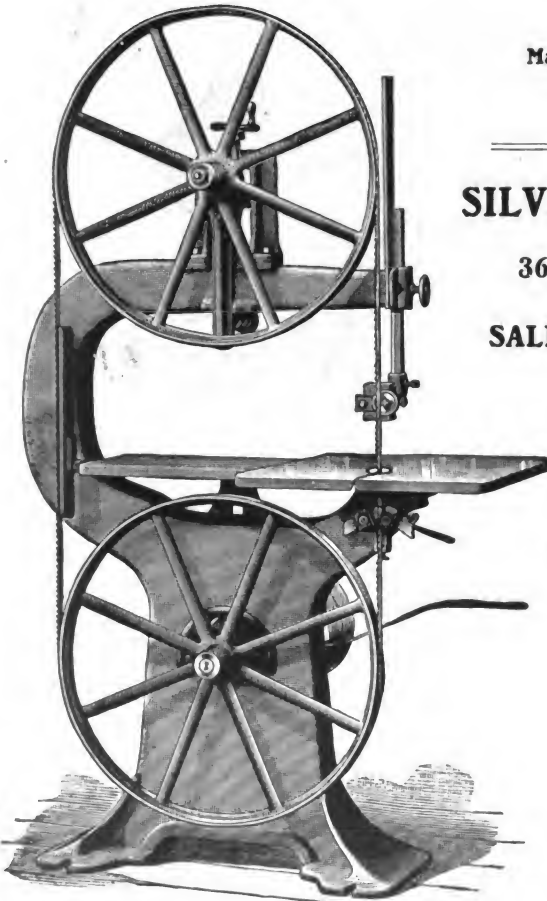


Fig. 822, 32 inch.

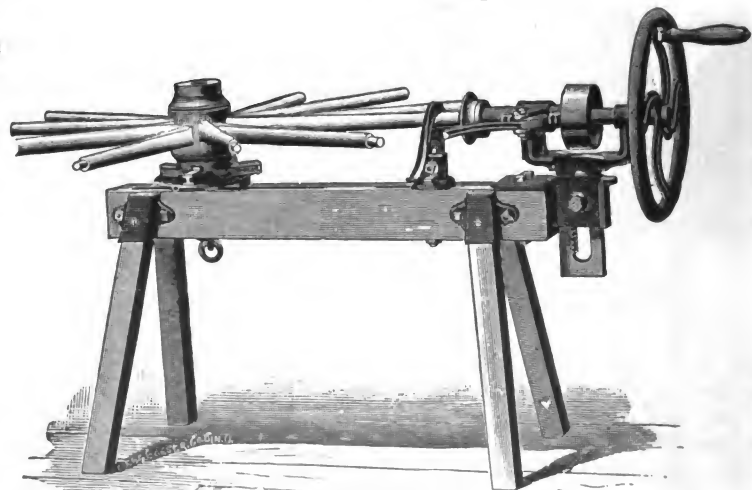


Fig. 718.

This Is Our New Year Offering

Read Every Word of It, For It Particularly Interests You

Special Offers, Prizes and Good Values all embodied

We are giving away FREE an AUTOMOBILE and GASOLINE ENGINE, also other PRIZES in cash. Circular, explaining in detail how you can win one of these prizes, will be gladly sent to you simply for the asking. These prizes are offered simply as a reward for business and do not affect our goods or prices in the least. Every one has a fair chance to win and you are invited to try. While this contest was inaugurated September 1st, don't think it too late to try, for it will not end until April 15th, and within this time your orders will surely cut a figure.

We wish to assure those who think there is no chance to win, that there is every opportunity to do so. Every order counts, no matter how small. To our original prize offer we are adding new prizes in the shape of merchandise as a fitting New Year offer, to be competed for by every blacksmith. The original prizes are five in number as follows:

An \$800.00 Automobile, First; A \$125.00 Weber Gas or Gasoline Engine, Second; \$50.00 in Cash, Third; \$25.00 in Cash, Fourth; \$15.00 in Cash, Fifth.

Our Additional New Year Prizes are as follows:

- 6th Prize—1 Fully Warranted Cray Brothers' Anvil, Weight 125 lbs., Valued at \$11.25.
- 7th Prize—1 Genuine Stoddard's Tire Upsetter No. 2, Valued at \$8.75.
- 8th Prize—1 New Advance Drill No. 12, Valued at \$7.25 (our regular price).
- 9th Prize—1 Reynold's Tire Bolting Machine, Valued at \$6.00.
- 10th Prize—1 Complete Set of Irwin's Auger Bits in Case, Valued at \$3.50.

We offer you Ten Prizes in all, every one of which is worth trying for.

EXTRA A year ago, as a New Year's Greeting, one year's subscription to the "American Blacksmith" was presented free to anyone not already a subscriber, who sent our name and address cut from our ad., accompanied by an order amounting to \$5.00, or more. We extend this offer to you again. If you accept, you get also a very beautiful 1905 Calendar. Your purchase also counts toward winning one of our prizes.

"A word to the wise is sufficient."
BE WISE—TRY.

IMPORTANT We wish to explain emphatically that our business, while large in volume, is composed entirely of small orders. We do business entirely by catalogue, eliminating all expense for the employment of traveling men. These catalogues are distributed throughout the country and our great volume of business is made up of many small orders. We mention this as assurance that your chance of winning one of the prizes is equal to that of your neighbor's or anyone who may compete. Remember, somebody has to win. This is not a game of chance but a reward for your business.

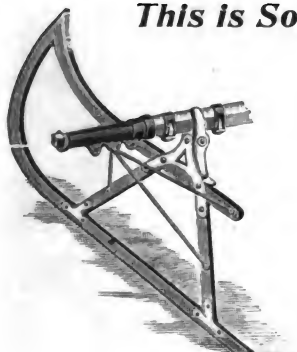
We Can Save You Money on Everything You Buy

GET ACQUAINTED WITH OUR GOODS AND THEIR QUALITY

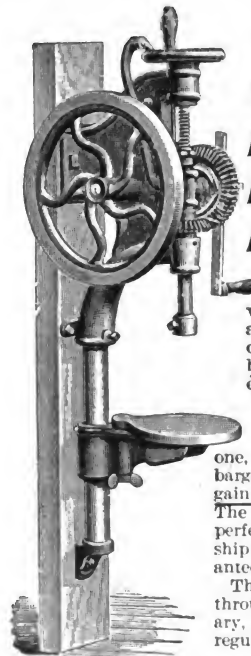
A Blacksmith Rule

something every blacksmith has use for: by mail, postpaid, only 33 cents. This is our No. 17 rule, particularly adapted for measuring hot metal; can be cooled without rusting by plunging in water. Just the thing for blacksmiths or metal workers. Two foot, two fold, made of spring brass, graduated in eighths and sixteenths of inches, $\frac{3}{4}$ inches wide.

This is Something You Ought to Know



that is, where to get the best runner attachments. We have a large stock, but if you want any, better order right away for they are a hard article to get and are selling rapidly every day. They are especially adapted for carriages, buggies, grocers' wagons, hacks, omnibuses, laundry wagons, surreys, dairymen's wagons, hearses, two wheelers, oil tank wagons and all kinds of low-down vehicles. The advantages of having springs on a sleigh are many. We carry the genuine Wyeth runners, the best made. Our stock consists of sizes suitable for $\frac{3}{4}$ " to $1\frac{1}{2}$ " axles inclusive. Our price for size suitable for $\frac{3}{4}$ ", $\frac{1}{2}$ " and 1" axles is \$6.50 per set; size for $1\frac{1}{2}$ " and $1\frac{3}{4}$ " axles is \$7.38 per set. Correspondingly low prices on all other sizes. Remember, send us your order at once while our stock is complete.



\$6.00

**Buys the
Best Advance
Drill Made.**

This Drill is an Advance Drill in every way and is all the name indicates. We consider it the best value of a Drill we have ever sold. If you have been looking for a Drill, or if you have not been looking for one but can use one, take advantage of this bargain price. This is a bargain—no mistake about it. The Drill is guaranteed to do perfect work; the workmanship and quality are also guaranteed.

This special price good only through January and February, not after March 1st. Our regular price is \$7.25.

OUR CATALOGUE is the most complete ever published, dealing with goods especially for the blacksmith and wagon maker. It is valuable for reference; it is a money-saver. Our 1904 catalogue, with revised sheet, will be sent free to any blacksmith or wagon maker and we invite you to ask for them. Our 1905 catalogue, which will far eclipse anything published for the trade before, is nearing completion. It will be mailed early in March. Write today for our 1904 catalogue and you will get it promptly. You will also be in line for the new 1905, and will save money on all your purchases. Address,

We are waiting and are ready to hear from you. **STOCKS THE LARGEST, GOODS THE BEST, PRICES THE LOWEST.**

CRAY BROTHERS,
Cleveland, Ohio.



THOUSANDS

of **HAHN** rubber horseshoes are being used daily all over the country. All who have put them to a practical test have voted them a marvel of utility and merit.

They are equally suitable for light carriage horses as well as heavy dray horses, and some of the leading racing, livery and private stables have adopted this shoe for regular use. Federal and municipal departments, express, freight and transfer companies, fire, police and ambulance departments, cab, coach and street car companies, besides the cavalry and artillery departments of the army, find the **HAHN** Give Entire Satisfaction, rubber horseshoe to "keep his feet" in all kinds of weather.



THE HAHN

horseshoe is the embodiment of a humane principle. It is lighter on the animal's feet than an ordinary shoe. It gives the horse confidence in its movements. It allows of a perfect fit, which is impossible in the ordinary rubber shoes.

It is the ideal horseshoe, no matter what the weight of the animal, the condition of the roads or the nature of the work. It means good luck to not only the horse, but the owner of the animal also.

THE HAHN

horseshoe prevents the horse from slipping or stumbling on ice, stone or asphalt. It prevents sudden jar and concussion. It gives the animal a soft tread such as was intended by nature. It makes the horse sure of his foot-hold at all times. It deadens the sound of the horse's hoofs. It saves veterinary surgeons' fees for the owner. It prevents lameness.

It is unexcelled by any other shoe on the market.

IN USE SINCE 1896.

The **HAHN** rubber horseshoe positively prevents horses from slipping or stumbling.

The **HAHN** rubber horseshoe is the only rubber shoe which can be thrown into the fire and heated.

The **HAHN** rubber horseshoe is the only patent rubber tread shoe that can be fitted to the horse's foot.

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360-368 Grand Street
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NEW REVISED EDITION

A TEXT BOOK OF

HORSESHOEING

FOR HORSESHOERS
VETERINARIANS

BY A. LUNGWITZ

TRANSLATED FROM THE 10TH GERMAN EDITION

BY JOHN W. ADAMS, A. B., V. M. D.

Undoubtedly the most perfect and practical work of the kind ever written. No shoer should be without it. Treats clearly and thoroughly on the anatomy of the horse and the foot, shoeing healthy hoofs and horses that interfere, winter shoeing, hoof diseases and defects, etc.

178 PAGES 160 ILLUSTRATIONS

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J. B. LIPPINCOTT COMPANY

PUBLISHERS

PHILADELPHIA

That Brokon Shaft!

REPAIR IT by using a

Pioneer Steel Socket Shaft End

It will please your customer; save him money and make the shaft better than when new. Almost every jobber in blacksmiths' supplies has them in stock. Ask about them.

Patented

The Pioneer Steel Socket Shaft End is made of two tubes one inside the other for reinforcement. These tubes are filled with a hard-wood stock shaped to fit. The outside tube is finished with a high-lustre black enamel, giving a patent leather appearance that stays on. It has a nickel-plated tip on the end, and a rivet is furnished for attaching to the shaft.

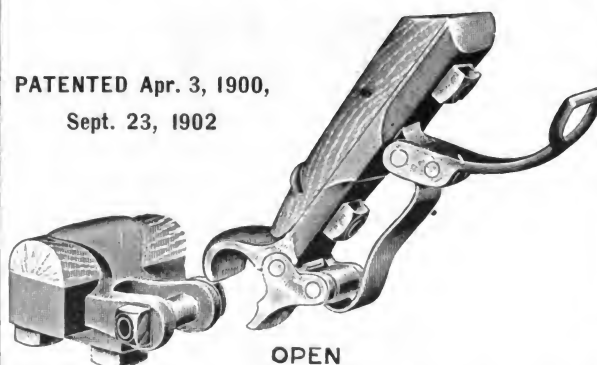
If you can't get them at your supply house, write us. We'll tell you where.

Crandal, Stone & Co.

Manufacturers, BINGHAMTON, N. Y.

THE HOLD FAST COUPLER

PATENTED Apr. 3, 1900,
Sept. 23, 1902



OPEN

All Steel All Right All the Time

Fits any bolt or lug from $\frac{7}{16}$ to $\frac{3}{8}$ inches in diameter. No Bushings of any kind required. Takes up its own wear. One hand, the only tool required to operate it. Quick as a Wink. Silent as the Grave. Drop forged from bar STEEL. Crucible STEEL Spring, every one right. Workmanship the BEST. Nothing cheap about it but the Price. STEEL'S the stuff, no Malleable Iron in the Holdfast. Made "a little better than seems necessary." We can furnish the Holdfast with Weldless long length shaft irons 28 to 34 inches long, and with 8-inch "T" pieces for cross-bar. Irons are $\frac{5}{8}$ by $1\frac{1}{8}$ inches in cross section, with quarter round edge. The Holdfast has the well-known BRADLEY quality, the ALL RIGHT brand. If you are interested, write for prices or order a sample pair.

C. C. Bradley & Son

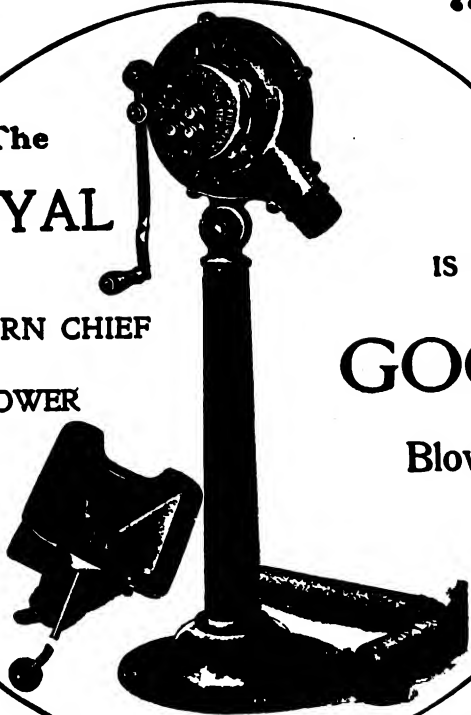
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THREE GOOD THINGS

"ASK THE DEALER."

The
ROYAL
WESTERN CHIEF
BLOWER

IS A
GOOD
Blower



ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.
Gears and Boxes are phosphor bronze and steel.
No spiral or worm gears.
Fan, 12 inches. Weight, 100 lbs.
Fire-pot measures 9x11½x4 in. inside.

No. 14 DRILL

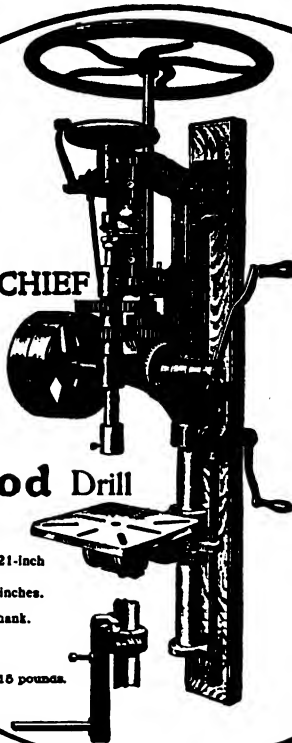
This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.

THE
WESTERN CHIEF
DRILL

No. 14
Is a Good Drill

Drills to center of 21-inch Circle.
Bores from 0 to 1½ inches.
Takes Bits ¼ or ⅝ Shank.

Weight, 315 pounds.



It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table

The
Royal
No. 100

Forge
Is a
Good
Forge

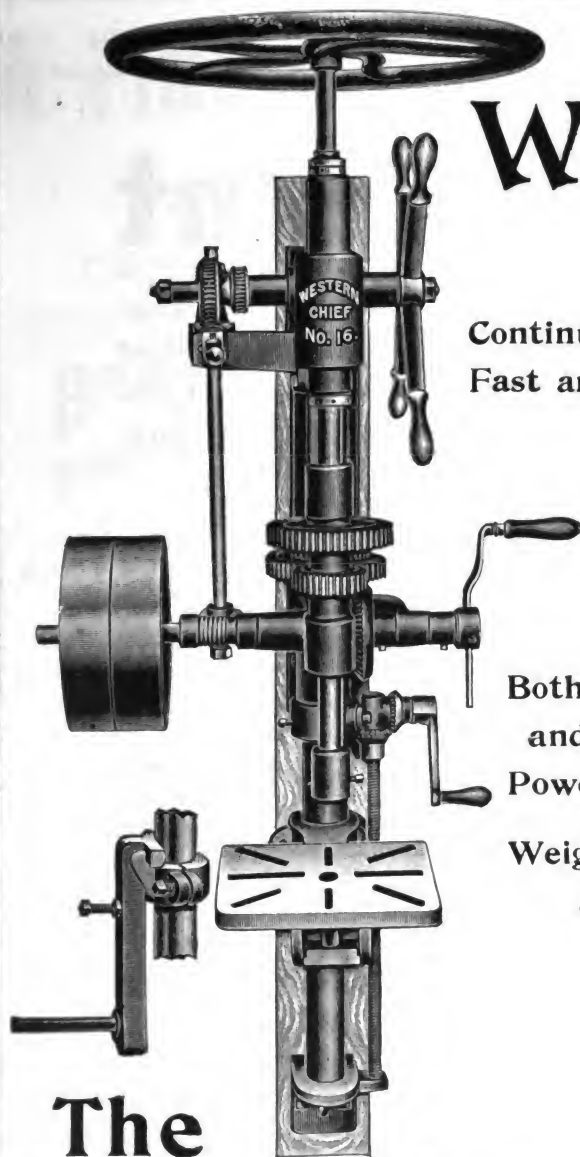
Hearth, 33¼x46 inches
Fan, 12 inches
Height, 80 inches
Weight, 275 pounds
Length over all, 64 inches



No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.
CHICAGO HEIGHTS, ILL.



No. 16 Western Chief DRILL

Continuous Screw Feed.

Hand Lever Feed.

Fast and Slow Speed.

All Gears are Cut.

Raise and Lower to Table.

Drills to center of 24-inch circle.

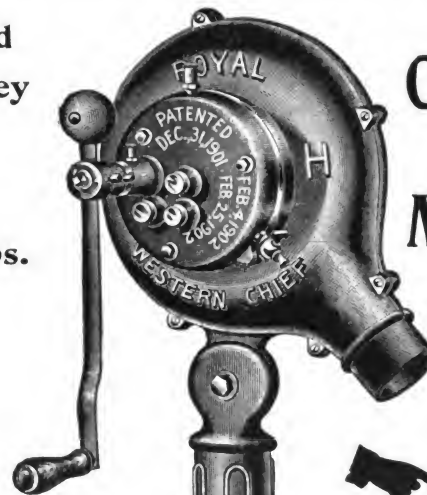
Bores 0 to 1½ in.

Spindle runs up and down 8½ inches.

Table runs up and down 16½ inches.

Both Hand
and Pulley
Power.

Weighs
360 lbs.



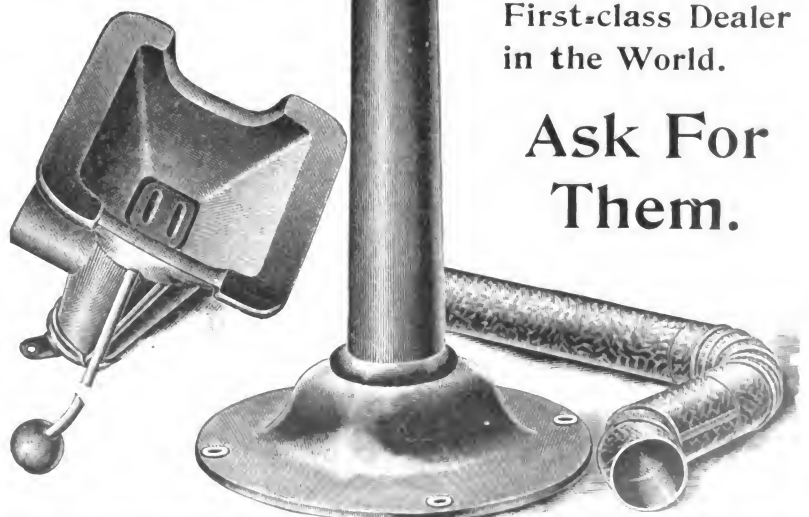
MADE BY
**CANEDY-
OTTO
MFG.CO.**

CHICAGO
HEIGHTS
ILL.

The Royal Blower

is absolutely free from all spiral or worm gears, and has not a ball bearing in it. Spiral and worm gears are short lived, and ball bearings are not suited to such high speeds. Phosphor bronze is used for the lead gear and bearings; and steel for the pinions and shafts. It is the simplest, lightest running and surest worker of any Blower on this day's market.

FAN, 12 inches diameter.
FIRE POT, 9x11½x4, inside.



Royal and
Western Chief
Forges, Blowers
and Drills are
sold by every
First-class Dealer
in the World.

**Ask For
Them.**

LOOK FOR THE NAME

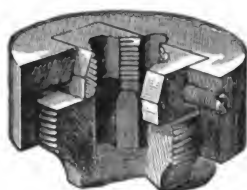
Little Giant

If you find this trade mark on your tools — then rest assured you have purchased the right kind; the kind that will last; the kind that will do the work, and the kind you are looking for — the best and only kind to buy.



PLUG TAP

WE MAKE TOOLS OF EVERY DESCRIPTION



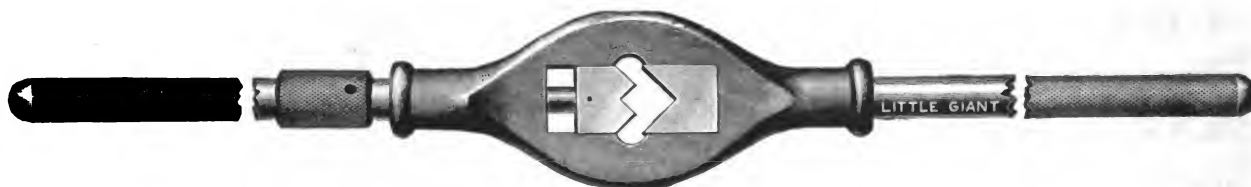
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Die and Collet
(Sectional view)

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- ◆ Bolt Cutters
- ◆ Butterises
- ◆ Dies of all kinds
- ◆ Farriers' tool boxes
- ◆ Nut Tappers
- ◆ Reamers
- ◆ Taps
- ◆ Threadcutting tools
- ◆ Tire Wheels
- ◆ Wrenches

Every
Kind and
Size
Suitable
for all
Purposes



"LITTLE GIANT" Screw Plates are widely known for high quality and the accuracy of the work they do.



KEEP IN MIND THAT

LITTLE GIANT TOOLS GIVE BEST VALUE FOR THE MONEY.
THEY ARE SIMPLE, PRACTICAL AND DURABLE.

Write for our catalogue. It is complete. It will show you all styles of Little Giant tools and we are sure that the prices we quote will interest you. **A Postal will bring it.**

WELLS BROS. COMPANY, Greenfield, Mass. U. S. A.

A FINE CHANCE FOR BIG PROFITS

HERE IS AN OPPORTUNITY FOR BLACKSMITHS TO
MAKE MONEY EASILY WITH LITTLE OR NO OUTLAY

CAST-IRON BREAKS; MEND IT WITH BRAZIT



We want every blacksmith and repairman to try

BRAZIT

because once they find out how easy it is to work and what snug profits it makes, they will always keep a supply on hand. As an inducement, we will send a sample set to any address, *prepaid* for

\$1.00

This trial set is sufficient to braze a large number of pieces. The directions are complete and simple.

We send our regular working sets, a complete outfit with plain directions, for \$5.00.

A trial of **Brazit** is the best way we know of for proving to you it will do as claimed. **We want you to try it.** You can do a big and profitable business mending all the broken castings in your neighborhood.

Using our compound, any smith can successfully braze broken castings in a few minutes, saving expense of a new casting and the expensive delay waiting for the same.

THOUSANDS OF DOLLARS

are lost every day because of broken castings. The expense of replacing broken castings is immense. Much money is lost because of machines lying idle waiting for broken parts to be replaced. **You can prevent these large losses by**

MENDING CASTINGS

and make a **big profit** for yourself. For instance, suppose a gear wheel breaks. It may cost fifteen or twenty dollars for a new one, and the mill would have to lie idle for perhaps a week before the new one arrived. By means of a few cents' worth of **Brazit**, however, you can repair the wheel **stronger than new** and make as much money in an hour as you often make in days.

BRAZIT WILL DO IT

It will successfully braze cast iron, braze cast iron to wrought iron, or weld steel to cast iron.

WRITE US TODAY

WITH BRAZIT

You can successfully mend all broken parts of agricultural implements, lawn mowers, sewing machines, gears, presses, windmills, stoves and furnaces, pulleys, locks, keys, pumps, toys, engines, machinery, tools of all description, in fact, anything made of cast-iron.

You do not need special tools or a special equipment to do the work; it is all done in your forge or with a brazing torch.

Read These Testimonials

This is to certify that I have had a number of pieces of cast iron machinery mended with "Brazit" which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.

WILLARD N. LANE.

WESTFIELD, Mass.

We acknowledge receipt of your favor of March 4th, together with sample of "Brazit" which we have tried and found satisfactory.

POPE MANUFACTURING CO.

GREENSBORO, N. C.

Your compound just received O. K. Have tested it today on three pieces of cast iron with much success. I have used _____ made by the _____ Your Brazit is easier to work and does better brazing.

J. C. ALFORD.

NOTE.—Mr. Theodore Brightman, of South Dartmouth, Mass., says: "I have used your compound and it worked O. K. Wish I had had some of it before."

U. S. Brazing Compound Company

INCORPORATED

113-115 SOUTH SECOND STREET

NEW BEDFORD, MASS.



CAPEWELL HORSE NAILS

have received the

HIGHEST AWARD

in all competitions
including

Gold Medal

at the

Louisiana

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ST. LOUIS, 1904

"The Best in the World"

The Best Driving Nails

The Best Nails to Hold

The Safest to Use

The Most Perfect In Form and
Finish

MADE BY

THE CAPEWELL HORSE NAIL COMPANY

HARTFORD, CONN.

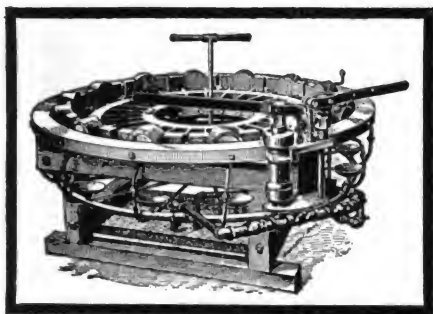
THE LARGEST MANUFACTURERS OF HORSE SHOE NAILS IN THE WORLD

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Chicago: 238-240 Randolph St.
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1905 CALENDAR AND COMPLETE CATALOGUE FREE ON APPLICATION

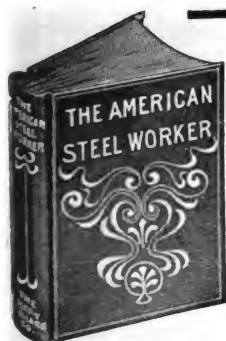


THE WEST HYDRAULIC TIRE SETTER

is a ROUND MACHINE for tiring ROUND WHEELS, and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when re-setting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight. Write us your requirements.

The West Tire Setter Company

===== Rochester, N. Y. =====



"BEST BOOK I EVER SAW"

Writes a blacksmith. Lots of others say so, too. Markham has been hardening steel for 27 years and studying it all the time. He tells in plain English just how to handle each case. Shows the best methods; but if you can't get them, it tells you how to do good work with what you have.

You can build a first class furnace if you want to from his plans and use any fuel you like.

Don't think you've got this information in other books—you haven't. It isn't there. Other books may read nicely and sound well, but none of the authors has had Markham's experience, and that's what counts.

343 pages, \$2.50.

Money back if not satisfied, or sent on approval.

AMERICAN BLACKSMITH COMPANY,
P. O. Drawer 974. BUFFALO, N. Y.

The Bradley

Ball Bearing

Shaft Coupling Automatically Takes Up the Wear

THE point is, you want a noiseless, quick-shifting Coupling that will stand the test of time. The BRADLEY does this. In the BRADLEY the shaft eye is surrounded by a packing of hard oak leather, compressed and moulded into shape and thoroughly saturated with tallow. This packing is the only part of the BRADLEY that wears.

BUT in the BRADLEY SHAFT COUPLING there is also a SPRING, of crucible steel, oil tempered and tested. The spring automatically takes up the wear on the leather packing.



"The spring does it."

THE spring's the thing that does the business. Its pressure is constant and uniform—just sufficient to hold the coupling, with its leather packing, securely in place, and TAKE UP THE WEAR. The BRADLEY is the ONE and ONLY SHAFT COUPLING that takes up its own wear.

C. C. BRADLEY & SON
SYRACUSE, N. Y.



"Victor"
Scroll Saw

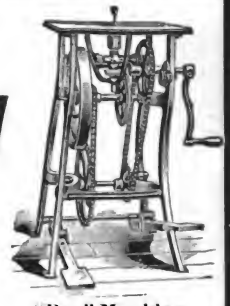


"Diamond"
Mortiser

FOOT, HAND AND POWER Wood-Working Machinery

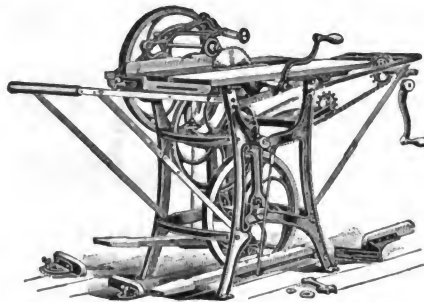
For Wagon-Builders, Carpenters, Builders, Cabinet-Makers and other Wood-Workers.

BUILT FOR HARD WORK, ACCURATE WORK AND LONG SERVICE.



"Rex" Moulder

One Man with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



No. 5 "Union" Combination Self-Feed
Rip and Cross-Cut Saw.

We Guarantee each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory, may be returned at our expense.



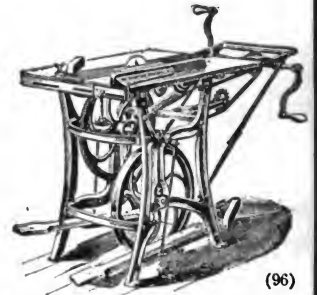
No. 8 "Union" Power Saw

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate their advantages.

SEND FOR CATALOG "A"

The Seneca Falls Manufacturing Co.

274 Water Street, Seneca Falls, N. Y., U. S. A.



No. 6 "Union" Combination Saw

"TRIUNE" COLOR VARNISH

(THREE IN ONE)

FIRST — Color

SECOND — Power To Cover in ONE Coat

THIRD — Straight Varnish Working Properties and Qualities

The Three Essential Features for a True Color Varnish

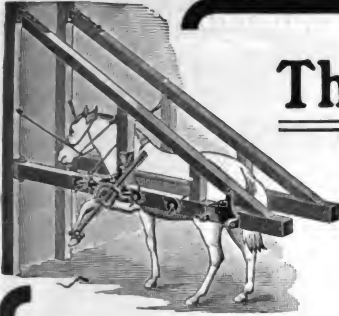
TEN POPULAR SHADES

F. O. Pierce Company

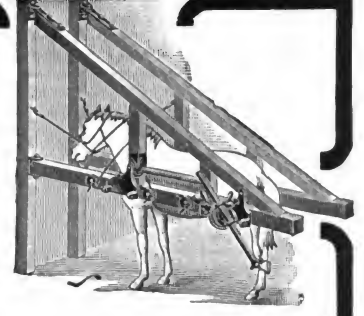
Office, 170 Fulton Street, New York.

Factories, Brooklyn, Long Island.

The Pictures Tell the Story



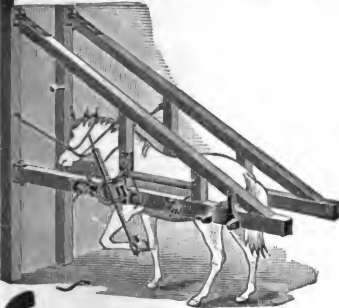
As these illustrations show, Barcus Stocks are strong and solid. They have no ropes and pulleys to tangle and break, and no cumbersome bracing to roof or floor. The frames swing back out of the way when not in use. The leg arm can be changed



quickly to any position convenient for working, and can be shifted from hind to fore foot, either side, in thirty seconds. Perfect and rapid ease of adjustment is but one of the many strong points of the Barcus Stocks.

BARCUS STOCKS

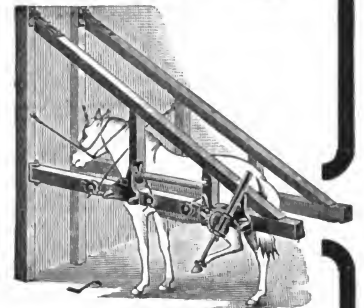
ARE THE BEST



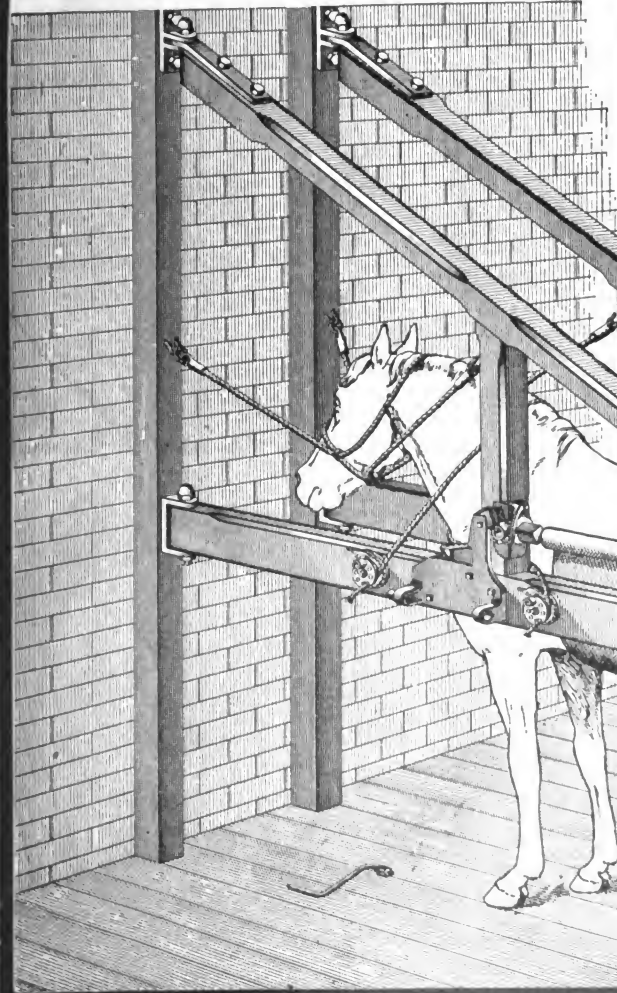
They are the best because they are the only ones absolutely guaranteed to hold any horse perfectly without danger to either horse or man. Because there is no danger of getting hurt while fastening a rope or strap around a horse's foot, as with other makes of stocks. Because you can place any foot in any position instantly. Because guaranteed not to chafe the foot.

Simple, Perfect, Reliable, Tested and Guaranteed.

The best machine ever placed on the market for holding and taming vicious horses and mules. Quickly adjusted, safely operated, sure to hold. Satisfaction guaranteed. The increasing demand for Barcus Stocks made necessary our removal to larger and finer quarters, where we are better equipped than ever.



Horse stocks stand between you and injury for life. Don't make the mistake of trying to save a few cents by getting an inferior make. Send for catalogue telling all about the Barcus Stocks.



GEO. BARCUS & COMPANY

Box 61

WABASH, INDIANA, U.S.A.

CANADIAN HORSE STOCK COMPANY

HAMILTON, ONTARIO, CANADA

Two unsolicited testimonials. — See Queries, Answers, Notes Column in this issue of THE AMERICAN BLACKSMITH.

"About two years ago I bought a set of shoeing stocks from Geo. Barcus & Co. I could not get along without them, in fact, the other smiths in the town have sent their bad kickers to my shop, and I never turn a mean horse away without having properly shod him." ERIC KUEHL, Corona, Cal.

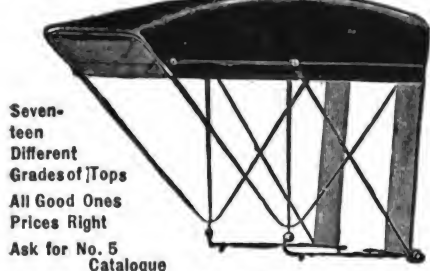
"I have had a Barcus horse stock in my shop over a year, and consider it the best invention for shoeing horses that was ever made. We have had horses in this stock that weighed over 1700 pounds and they had to be shod as they could not get away. Get a Barcus and you will not only have a stock that will hold them, but as easy to operate as well." C. N. HOLT, Gouverneur, N. Y.

In ordering a Barcus Shoeing Stock be sure to give height of your shop from floor to ceiling.

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Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interest will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

A COMPLETE LINE OF CARRIAGE TOPS AND TRIMMINGS

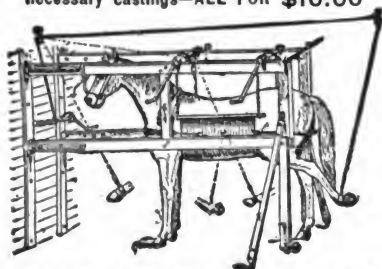


Seven-
teen
Different
Grades of Tops
All Good Ones
Prices Right
Ask for No. 5
Catalogue

C. A. HALLIDAY, 24 CEDAR STREET, ONEIDA, N. Y.

BUILD YOUR OWN HORSE RACK

Any blacksmith can do it and save money.
Shop right, complete plans, belt and all
necessary castings—ALL FOR \$10.00



THE ORIGINAL SCHODORF ACME SHOEING RACK
has proven the best and most practical device for shoeing bad and unruly horses ever put on the market. Simply constructed. Frames swing back against wall, where they take up no room at all. Adjusts itself to any size horse. Takes but a few moments to fasten a horse securely. No chance for injury to horse or smith. Thousands in use, each giving satisfaction. Jas. Leighton, Sylvan Grove, Kan., writes:—"I shod one of the meanest mules in Kansas in it, and it held him so tight he could do nothing but squeal. Would not take \$100 for it." Send for shop rights today. Build your own rack and you will have the best money can buy.

A. C. SCHODORF
70 LEVEE STREET COLUMBUS, OHIO

CUT OFF YOUR IRON AND STEEL WITH AN IMPROVED POWER HACK SAW

It does true work, will not break saws; three sizes. Price, \$15 to \$30. Write for circulars and booklet: "A Short History of Saws."

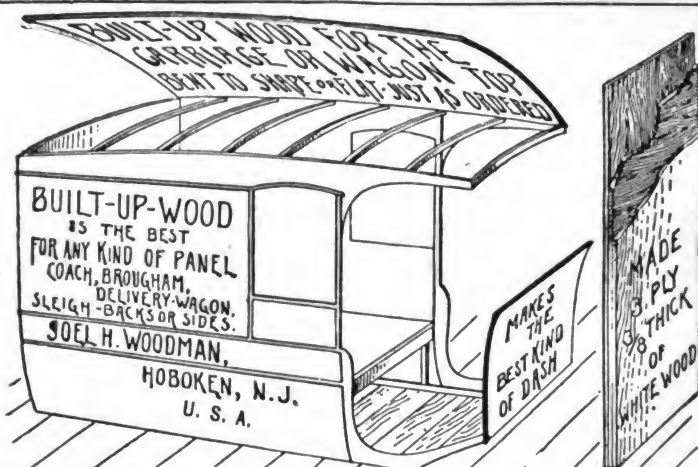
L. H. OLMSTED, Hasbrouck Heights, N. J.

TRIMMINGS FOR EVERYTHING ON WHEELS

Wholesale Manufacturers

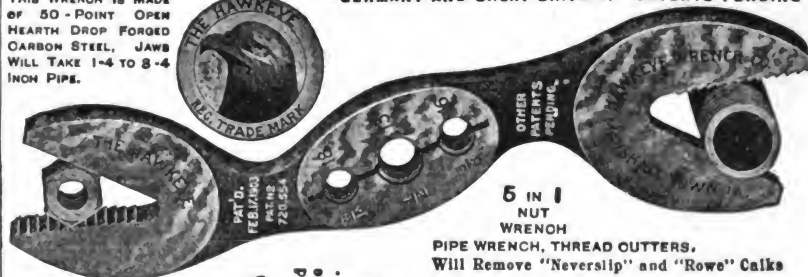
Write For Catalogue and Prices. EXPORT WORK OUR SPECIALTY. Lawrenceburg, Indiana, U. S. A.

INDIANA TOP & VEHICLE CO.



THIS WRENCH IS MADE OF 50-POINT OPEN HEARTH DROP FORGED CARBON STEEL. JAWS WILL TAKE 1-4 TO 2-4 INCH PIPE.

PATENTED IN UNITED STATES, CANADA, FRANCE, GERMANY AND GREAT BRITAIN. PATENTS PENDING



Best Wrench Made For Automobiles Has More Uses Than Any Wrench Made

No. 200 Regular
No. 400 Same as No. 200 only full Nickel Plated

The dies in wrench for English and foreign trade, furnished with Withworth style of thread, if wanted.

Manufactured by

THE HAWKEYE WRENCH CO., MARSHALLTOWN, IOWA, U. S. A.

This Wrench sells on sight. All that is necessary to sell it is to show it. Should be sold by all hardware stores, agricultural implement dealers and blacksmiths. It is now handled by all the leading hardware jobbers in this country.

Better order a dozen today.

ROWE PATENT SQUARE SHOULDER CALKS

The use of these Calks in the winter season will save you time and money for the following reasons:

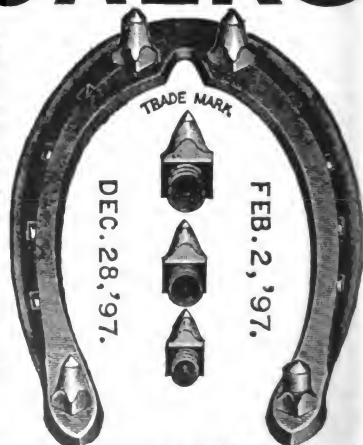
- 1st. The Calks are made with a square base, which effectually prevents their being screwed against the foot by an inexperienced person.
- 2d. These Calks do not require a special wrench, as the square base allows them to be removed by any forked or monkey wrench.
- 3d. The Base acts as a Pinch Nut, and prevents the Calk from working loose on account of any jar.
- 4th. The base prevents the shoe from wearing around the Calk, so that it retains its full thickness at all times.
- 5th. The Calk can be used in machine made shoes with perfect satisfaction, and the first cost will be but a trifle more than in the ordinary way of shoeing.
- 6th. The Calks are made of hard center in five sizes, $\frac{3}{8}$, $\frac{7}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{4}$, both sharp and blunt.
- 7th. A horse shod with these Calks will travel easier than when shod in the usual manner, and one set of shoes with proper care will last an entire winter.
- 8th. Owners of horses that are in constant service (to wit: Grocery, Express and Hack Horses) will find it to their advantage to use these calks, especially in the winter.



Rowe's Improved Shoulder Shoe Calk is superior to the Round Calk made without a shoulder, which in the hands of an inexperienced person allows it to be screwed through the shoe against the foot.

The Round Calk, being without a shoulder, requires a special wrench, and also allows the calk to bend over and get loose in traveling on hard frozen ground.

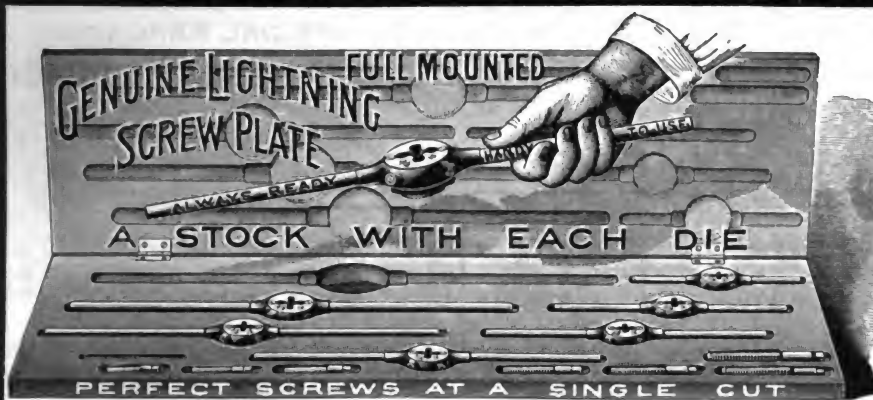
By using Rowe's Improved "Shoulder Shoe Calk" it is impossible to screw it through the shoe against the foot. Any inexperienced person with an ordinary wrench can adjust them; the shoulder prevents the shoe from wearing around the calk, and also acts as a pinch nut, preventing the calk from working loose. Being made steel centered, chemically hardened, they will neither bend nor break, which makes them far superior to all others in durability.



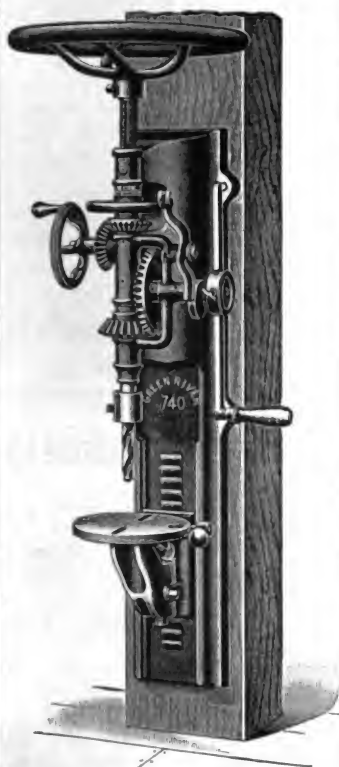
The only Shoe Calk made with Steel Center running whole length of Calk and welded to the iron.

ALLEN H. ROWE, Pres't. and Treas., 28 SHELDON ST.

MANUFACTURED BY **The Rowe Patent Square Shoulder Shoe Calk Co., HARTFORD, CONN.**



Instead of having but a single stock to a set of several dies, each die is furnished complete with its own stock of suitable size and weight. The time and trouble in fitting and changing dies for each occasion is saved. All the dies in a set can be used at the same time.



Green River Drilling Machine. Fig. 740

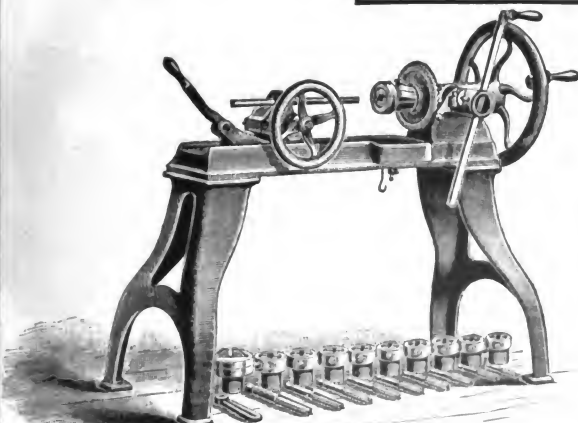
1871-1905

SOME of our old customers can remember when we introduced Lightning Screw Plates and Bolt Cutters—over thirty years ago—dies doing their work at a single cut—as a startling novelty. We used to lend them for a week to convince people that it was not “too good to be true.” We revolutionized the old practice—but we didn’t stop at that—we have kept improving ever since.

Above is a cut of our Full Mounted Lightning Screw Plate—one of the best forms. Send for Catalogue and see large variety of these and other fine tools which we offer.

We beg to announce to our customers that during the year of 1905 the Wiley and Russell Mfg. Co. will continue to offer Tools and Machinery of the very highest quality. Our “Lightning” and “Green River” Brands enjoy universal popularity, on account of their superiority over all others—and it is the object of our Company to maintain the reputation these tools have won.

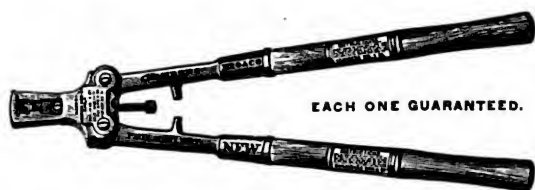
We Make
“**Lightning**”
and
“**Green River**”
Brands.



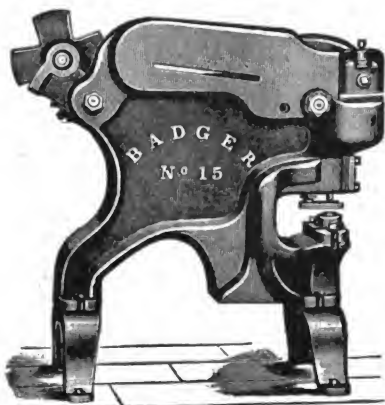
Green River Bolt Cutter. No. 20

Wiley
and
Russell
Mfg. Co.
Greenfield, Mass.
U. S. A.



**BOLT CLIPPERS****CHAMBERS BROS. CO.,****N. Fifty-Second Street,
Philadelphia, Pa.****WHAT? YES!****No. 15 THE BADGER No. 15**

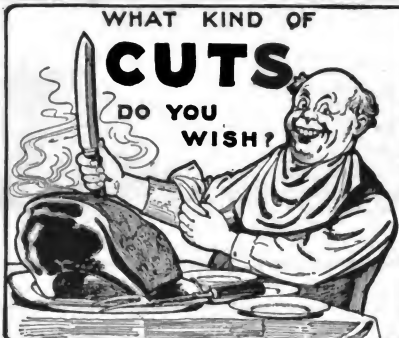
Will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{5}{8}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.



Weight 800 Lbs.

CAN YOU BE WITHOUT ONE?

Write for Catalogue and prices.

ROCK RIVER MACHINE CO.
JANESVILLE, WIS., U. S. A.

CUTS for Circulars, showing exactly what is needed.
CUTS for Booklets, making the matter plain and interesting.
CUTS for Catalogs, illustrating the article clearly.
CUTS for Street Car Cards, attractive and attention-compelling.
CUTS for any purpose, and all of the highest quality.

Three-Color Half-Tones a specialty.

ASK TO SEE SAMPLES OF OUR WORK.**BUFFALO ENGRAVING COMPANY,**
Cor. S. Division and Elliott Sts.
BUFFALO, N. Y.**SPECIAL BARGAINS****Second Hand Machinery**

2 Bradley Strap Hammers 15 pounds.....each \$125.00
1 Buffalo Forge Co. Blower—Inlet 84-inch, outlet 26-inch—square..... 80.00
1 8-H.P. Porter Horizontal Steam Engine..... 75.00
1 No. 2 Garvin Sprocket Miller (automatic), can be readily converted into Lincoln Miller... 150.00
1 Hub Drilling Machine..... 20.00
1 Tube Cutter (hand)..... 15.00
2 Merrill Drop Hammers (one 400 lbs., one 500 lbs.).....each 200.00

Cortland Carriage Goods Co.
CORTLAND, N. Y.**YOU CAN WIN**

Big profits and the **Farm Wagon Business** by equipping your work with the **Folding Box**. It has practical time, labor and storage saving features which please all classes of farmers. You build it right in your own shop from same woodwork as the regular box. Write today for illustrated circulars to

FOLDING WAGON BOX CO.
HAVERHILL, OHIO.**Cortland Welding Compound Co.**

Manufacturers of

**Climax Welding Compound,
Cherry Heat Welding Compound,
and BORAX-ETTE.**



BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

SAMPLES FREE.**MAIN OFFICE AND FACTORY, CORTLAND, N. Y.**

CANADIAN FACTORY, HAMILTON, ONT.

Address All Correspondence to CORTLAND, N. Y.

Two Good Works on Horseshoeing

A Text Book on Horseshoeing, by A. Lungwitz. A complete treatise on anatomy, shoeing, bad feet, interfering, etc. Cloth bound, 168 pages, 141 illustrations..... **\$2.00**
Magner's A B C Guide to sensible horseshoeing. Cloth bound, 130 pages, 400 illustrations..... **1.00**
Sent postpaid on receipt of price.

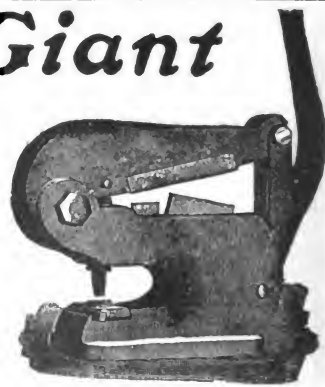
IT TELLS YOU HOW TO PAINT
carriages, wagons and sleighs. Gives full directions for all kinds of work. Full of good receipts and useful hints.**Practical Carriage and Wagon Painting**

A new enlarged edition of a standard book by M. C. Hilliek, price, postpaid..... **\$1.00**

AMERICAN BLACKSMITH CO., Box 974, Buffalo, N. Y.**Little Giant Punch and Shear.****Most Powerful Lever Punch and Shear Made.**

100 lbs. on lever gives 25,000 lbs. pressure on punch. Always ready for work, and it does the business. Made in three sizes. No. 1 cuts iron $\frac{3}{4}$ " thick up to 8 inches wide and 1 inch round; it will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron. Weight, 500 lbs. No. 2 cuts iron 6x $\frac{3}{4}$ " and $\frac{7}{8}$ " round, punches $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron. Weight, 350 lbs. No. 3 cuts iron 6x $\frac{3}{4}$ ", punches $\frac{1}{2}$ " hole in $\frac{1}{2}$ " iron. Weight, 250 lbs. Occupies a floor space when lever is up, 10x24 inches. It is simple in construction, there being only two pieces of casting in it. You can duplicate any part of it in your own blacksmith shop. We furnish with each machine five sets of punches and dies, any size, from 3-16 to $\frac{3}{4}$ ". There are two lower shears, one for round and one for flat iron. You will find use for it every day.

LITTLE GIANT PUNCH & SHEAR CO., Sparta, Ill.
SUCCESSORS TO C. CROTHERS, KANSAS CITY, KAN.
For Sale by Wholesale Jobbers and Hardware Trade. Send for Circulars.



BOLTS AND CLIPS

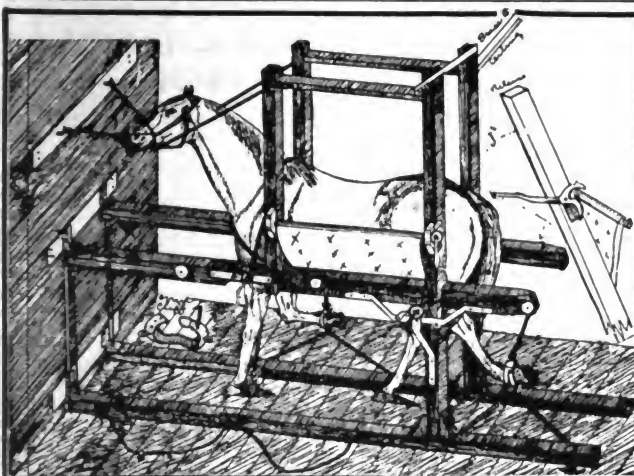
We make the famous
"STAR" CARRIAGE BOLTS

the best bolt on the market for the money. Also a full line of

Carriage Forgings,
Nuts, Washers, Etc.

Send 3c stamp for our new 1905 Catalogue.

COLUMBUS BOLT WORKS
COLUMBUS, OHIO.



HEMPHILL'S NEW SHOEING STOCKS

ARE THE BEST. They are neat and very strong. There are no weak parts to wear out or break. Very quick and easy to operate. Hold horse in easy position. Have shod horses weighing 2200 lbs. The frames turn either way to the wall. Can be used in any kind of a building as there is no strain on the building. The automatic felt-lined cuffs will not chafe the foot. There are other improvements which no others have. Write for descriptive catalog and testimonials. Satisfaction guaranteed. Address

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The Columbian Hardware Company CLEVELAND, OHIO.

**Our Solid-Box Wrought-Steel Blacksmith Vises
Can't Be Beaten.**

Jaws forged from one piece of ingot steel. Faced with highest grade crucible tool steel. With each one goes our golden guarantee.

We Make the Famous Columbian All-Steel Anvils

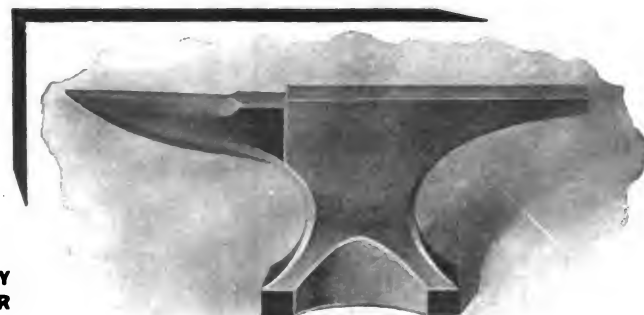
Each anvil is constructed with great pains and skill. Fully warranted to stand the test of long, severe service. They contain the best material and workmanship.

"**T**HE sample anvil that you sent us a short time ago was a very handsome tool, and we are very much pleased with it. If you can make that kind of anvils, there will be no trouble in working up a trade on them."

From The Western Tool Co., Lansing, Mich.

This is only one of many testimonials.

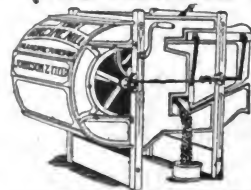
OUR MOTTO: GOODS OF THE FIRST QUALITY
PRICES--THE VERY LOWEST FOR
QUALITY FURNISHED. . . .





DEATH TO HEAVEN
Guaranteed
Newton's Horse, Cough, Dis-
temper and Indigestion Cure.
A veterinary specific for wind,
throat and stomach troubles.
Strong recommenda. \$1 per
can. Dealers, mail or Ex. paid.
Newton Horse Remedy Co.
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THIS FANNING MILL FREE



In order to introduce the
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Mill in your locality and
to repay you for your
slight assistance, we
will send you this per-
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ABSOLUTELY FREE.

The leader for 25 years.
Lighter running, larger
capacity, more perfect
separation, greater
strength, longer life and

more uses than all others. Don't lose this chance. We pay
freight 500 miles. Write today.

JOHNSON & FIELD MFG. CO., Dept. B, Racine, Wis.

**THE
DURKEE
Disc and
Colter
Grinding
Attachment
FOR
EMERY STANDS**

Grinds all **PRICE** **JUST**
Sizes of **WHAT**
Discs and **\$5.00** **YOU**
Colters **WANT**

Ask your Dealer for them
or the Manufacturers

DURKEE & RICHARD
WOODBINE, IOWA.

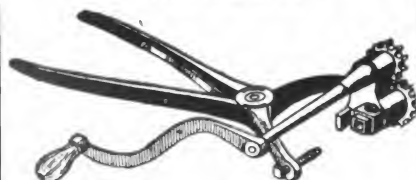
LATEST AND BEST

Common Sense Punch and Shear

5 sizes punches without a change. Will cut $\frac{1}{8}$ "x4,
 $\frac{3}{8}$ " rod iron, or $\frac{1}{4}$ "x6 plow steel. Will
punch $\frac{1}{8}$ " hole in $\frac{1}{4}$ " iron.



Common Sense Punch and Shear



Common Sense Tire Bolter

For particulars write

SCHUYLER CO.

626 Bryant St., San Francisco, Cal.

A Good Gear!



**DESIGN GOOD.
MATERIAL GOOD.
WORKMANSHIP GOOD.
WE ONLY MAKE THE BEST.**

O. M. Milk Wagon
Gear No. 251.

Our exhibits at Milwaukee and New York
are right up to the minute. We lead always.
Our new catalogue shows sixty different
styles of gears as well as our line of Surreys,
Buggies, Road and Pleasure Wagons in the
white; also all kinds of Bodies, Stick Seats,
Tops, Trimmings. **IT'S FREE. Send for it.**
With our new buildings and increased
capacity we will fill all orders promptly.

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We Want a Blacksmith

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A new idea in holding up shafts.
Fills a long-felt want. Endorsed by
all who have used them. Nothing to
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out. Always ready for use. Can be
used on any style of light vehicle.

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SHAFT HOLDER**

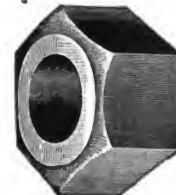
We will send you an agent's sample, express
prepaid, for 25 cents.

They sell to all vehicle owners on sight. You
can make a nice profit selling the **Perfection**
to your customers, especially to liverymen.

WRITE AT ONCE FOR SAMPLE

CITY CARRIAGE WORKS, Fort Wayne, Ind.

"MILTON"

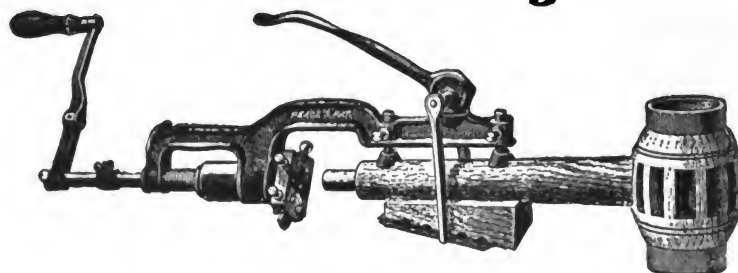


**ARE PERFECT.
THE PRICE WILL IN-
TEREST YOU EVEN IF
NOTHING ELSE WILL.**

**NUTS &
WASHERS**

The Milton Manufacturing Co.,
MILTON, PA.

**PEACE'S Improved-Spoke
Tenoning Machine**



Every machine warranted. No need of using a spoke trimmer, as the knife starts on the
blunt end of the spoke and centers perfectly. The chuck, to hold bit for felloe boring, is ad-
justed without removing the cutter head. The auger is kept cutting by force of a spring.
Anyone can work it; is adapted to any size spoke or dish of wheel; is readily applied without
moving wheel from where spokes are driven; is easily clamped to the spoke in a second's time,
so as to hold it steadily while boring, and is as quickly detached. Cuts every tenon perfectly
true, cutting from $\frac{1}{4}$ to $\frac{1}{2}$ inch.

Price, Net Cash, **\$8.50**
Price, with Felloe Boring Attachment, Net Cash, **9.50**

Sold by Paddock-Hawley Iron Co. Gen'l Agents,
St. Louis, Mo.

DEALERS in Iron, Steel, Wagon and Carriage Materials and Tools of all kinds.
MANUFACTURERS of Iron and Steel Roofing and Building Material.
MANUFACTURERS of Wagon Wood Stock and Hardwood Lumber. Write for catalogue.

Don't buy it until you try it

—ARE THE TERMS ON WHICH WE SELL THE—

CAPITAL ENGINE

**Free Trial for 30 Days
in your own Shop**

CAPITAL GAS ENGINE CO.

We have one of your gasoline engines that we bought of you and installed in our plant. We are free to say that it is the best and simplest engine that we know of, any place. Anybody can start it. It is like starting a steam engine, and when started it is almost noiseless, as it runs so smooth. The writer has just come home from the St. Louis Fair and must say that I saw a good many different gas engines running there, but I did not see one that runs as smooth as the one we have here. We wish you all the success that you deserve.

W. B. STURGIS & SON, Shelbyville, Ill.

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Capital Engines excel:**

We use plenty of iron, giving ample strength to all parts.

The igniter is simple and positive.

The fuel is elevated by air pressure instead of by pump.

The valves are vertical and completely water-jacketed.

The sight feed and perfectly operating mixing valves.

Only the finest materials are used throughout.

Each engine is given a thorough test before leaving the shop.

With each engine goes our broad guarantee, together with full directions for connecting up, starting and operating.

Capital Engines are especially noted for simplicity, durability, smooth running and economy of fuel.

We will ship a Capital Engine on 30 days' free trial to any responsible blacksmith with the understanding that if you are not perfectly satisfied at the end of that time, you can ship the engine back

At Our Expense

The reason we can make this liberal offer is because we know that the engine will satisfy you if you will give it a trial. Our engines are especially adapted for blacksmiths and wagon repair shops.

We warrant these engines, with proper care and treatment, to run well and develop the power for which they are sold. If any defects in material or workmanship develop within one year from date of sale they will be replaced without charge, provided broken parts are delivered to us f.o.b. Indianapolis.



THE CAPITAL VERTICAL GAS OR GASOLINE ENGINE.
Built in Three Sizes, 1½, 3 and 6 H. P.

**Write us for full particulars and we will send you
one of our Catalogues.**

Capital Gas Engine Co.

INDIANAPOLIS, IND.

Did You Get a Good Calendar?

If not, you can get a handsome one, as shown and described below, sent carefully packed, by subscribing **Now** for THE AMERICAN BLACKSMITH. The price is \$1.00 per year—every month's issue will contain just as much practical shop reading as this one does.

As a Special Extra Offer We will also give you, if you subscribe at once, your choice of any one of the following premiums:

- (a) A 14-inch Heller Bros.' Standard Horse Rasp.
 - (b) A complete Rubber Stamp outfit. The stamp can have two lines on it, your name and your address. A pad in a neat tin box is furnished for inking the stamp. It is a mighty useful little outfit. With it you can sign your name neatly and quickly on letters, bills, envelopes, etc.
 - (c) A Hoof Knife, see below.
 - (d) A Hammer Watch Charm, see below.
 - (e) A Bench Level, see below.
- If you are not a subscriber you will find a subscription order blank in this paper. State which premium you want.

Every Reader

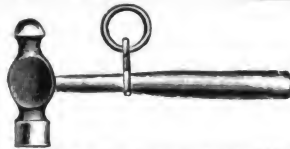
of this paper will find it worth his while to get us one or more new subscribers. For a limited time we will give you six months' credit on your own subscription account for each new subscriber. If you prefer premiums or cash commissions, write us for particulars.

Extra!

Ten cash prizes, \$5.00 each, will be awarded to the ten persons sending us the largest number of new subscribers before May 1, 1905. These prizes are in addition to the above premiums, commissions or credits. Will you try?



This cut shows our hoof knife, Heller Bros.' make, wood handle, about 10 inches long. Made of crucible steel and carefully tempered.



This is a miniature blacksmith's hammer watch charm. It is 1 3/4 inches long and highly polished. A nice charm for a smith.



Our bench level is 3 1/2 inches long, neatly finished, and very accurate. Handy to have around.



The Calendar is 5 1/2 x 10 1/2 inches, lithographed in ten colors, on stiff cardboard, with dark green month pad. Very handsome.

To Our Regular Readers

THOSE CALENDARS that we furnished to subscribers with their name on them proved very popular. Lots and lots of our readers took advantage of the opportunity to get some calendars for advertising their shops.

ED. HAMMIL, Roseville, Cal., writes us: "The Calendars I ordered of you arrived in fine shape. They are worth twice the money you ask for them."

It is not too late yet to use some. We have a few left, and will deliver promptly to those whose orders come first.

- (1) 50 Calendars, complete, postpaid, . . . \$2.00
- (2) 50 Calendars and one year's subscription, . . . 2.75
- (3) 50 Calendars and two years' subscription, . . . 3.25
- (4) 50 Calendars and four years' subscription, . . . 4.00

The price includes putting your name on them instead of ours and mailing them prepaid.

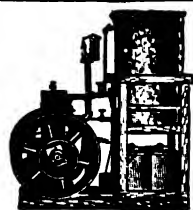
To accept this offer, you must either be or become a reader of THE AMERICAN BLACKSMITH, with your subscription paid at least to next January.

We recommend that you take advantage of the liberal four-year offer. The paper alone or the calendars, either, are worth more than \$4.00.

If you are not a subscriber, you can take advantage of offers (3) or (4) above. If you can't use 50 calendars, \$1.00 brings you the paper for a year, one calendar and a premium—see above. Mention this offer, it is a special inducement for you to try the paper NOW. Sample copy of the paper sent free to any address, on request.

American Blacksmith Company

P. O. Box 974, Buffalo, N. Y., U. S. A.

**BEATS ALL**

But we are bent on introducing our "LITTLE GIANT" 1½ H. P. Complete as shown in cut at **\$58.50.**

Just 100 will be sold at this price. Orders will be filled in turn as they come in. Marine, portable and Stationary Meters all sizes. **SEND FOR CATALOG.**

Duluth Gas Engine Works, Mfgs.
DULUTH, MINNESOTA, U. S. A.

SPAVINOFF**For Horses and Cattle.**

Removes unnatural growths and lameness, leaving places smooth and clean. Can not be discovered by the best horse-men that they ever had an enlargement.

What Others Say About It.

I have used SPAVINOFF successfully after complete failure with other remedies of established reputation, and, in my estimation, there is no other known remedy so sure, safe and easy to use as SPAVINOFF for removing all unnatural bunches or enlargements from horseflesh.
A. J. HOLMES, Afton, N. Y.



Sent by Mail. Price, \$1.00 per box.

... CONSULT ...

Keystone Wagon Works

READING, PA.

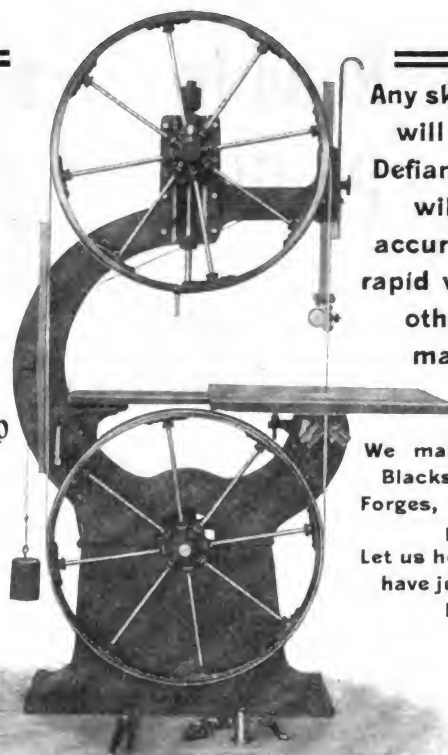
FOR

Platform and
Three Spring
GEARS
in the White.

Catalogue for the Asking.

JUST ONE WORD "DEFIANCE"

That Name
is
Sufficient
to
Guarantee
Workmanship
and
Material



Any skilled mechanic will tell you that Defiance Band Saws will do more accurate and more rapid work than any other machine manufactured

We make a specialty of Blacksmith Drills and Forges, and carry a complete line. Let us hear from you. We have just what you are looking for

OUR NEW IMPROVED 36-INCH BAND SAW

WHEELS—36 in. diameter, 2 in. wide. Made of either cast iron or cold rolled shafting, with wooden rims covered with pure gum rubber, ¼ in. thick.
TABLE—Iron with wood center. Easily tilted and especially convenient for sawing bevel.

GUIDE BAR—Steel and square in section. Counterweighted and easy to adjust.
WEIGHT—Ready for shipment, about 1100 lbs.

Our 1905 Catalogue will interest you.

Send name and address—we will do the rest.

SIDNEY TOOL CO.

BOX 206

SIDNEY, OHIO

Blacksmiths' Tongs

Are drop-forged, without weld, from one solid piece of superior steel. They are smooth and uniform, with handles tapering to the right proportions.

Will hold round, flat, square or oval stock. Far superior to any hand-made tongs, and can be furnished for half the cost. Longer and larger tongs made if wanted.



V Tongs for Holding Round and Square Iron.

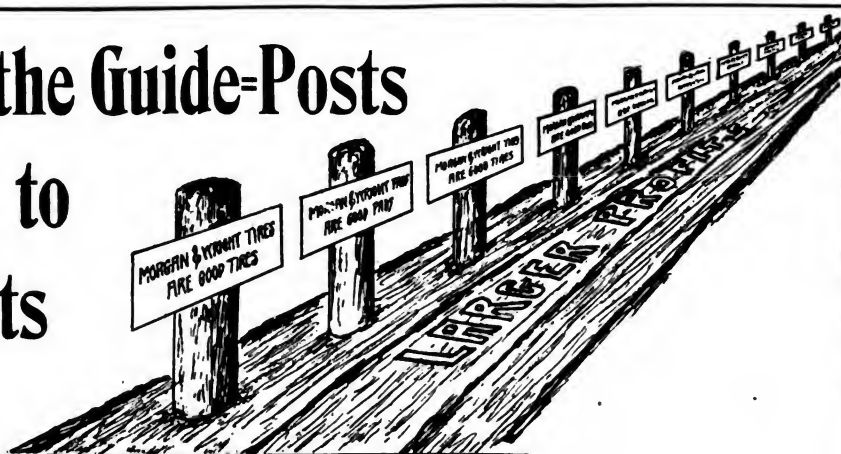
Machine Tool Tongs, Big Tongs, Little Tongs, All Kinds of Tongs. Superior quality; 60,000 pairs in use. Write for Circulars and Price List to

Allen-Randall Co.

310 MAIN STREET,

SPRINGFIELD, MASS.

Hanging on the Guide-Posts on the Road to Larger Profits



A STORY WITHOUT WORDS



THE OLD WAY

We are **pioneers** in the manufacture of **long-length** vehicle tires.

We are **originators** of the only **successful** method for the **uniform vulcanization of every inch of rubber** in any given length.

COMPARE THE TWO.

One, the **OLD WAY** of buying Tires; the other, the **M. & W. WAY**—The Profit-Saving Way.

Bear in mind that we have no **SECOND-GRADE** tire. One quality **only**—the best.

One price—the lowest **possible** price at which tires **of this quality** can be sold.



THE M. & W. WAY

FOR THE HORSE,
HORSESHOER AND
HORSE OWNER.

Morgan & Wright Pads are the Best

THEY MEAN
HEALTH FOR THE HORSE
PROFIT AND TRADE TO
THE SMITH.
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CUSTOMER.



Morgan & Wright Pads

ARE WARRANTED
TO OUTWEAR ALL
OTHER MAKES.

EASY TO FIT

RUN LONGER
THAN OTHER
BRANDS.

WE TAKE SPECIAL PRIDE
IN THE SUPERIOR
QUALITY OF OUR PADS.

Get a Trial Order from your Dealer

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Know Electricity

It is the most valuable knowledge a man in the mechanical or kindred fields can possess. Every reader of THE AMERICAN BLACKSMITH knows the value of practical applied electricity.

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There is now on the press the latest, simplest, most comprehensive and most practical Manual of Electricity ever published, the

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PROF. WILLIAM ESTY, head of the Department of Electrical Engineering, *Lehigh University*.

H. C. CUSHING, Jr., Wiring Expert and Consulting Engineer.

PROF. GEORGE C. SHAAD, *University of Wisconsin*.

J. R. CRAVATH, Western Editor of the *Street Railway Journal*.

PROF. LOUIS DERR, *Mass. Institute of Technology*; **WILLIAM BOYER**, Telephone Expert and Consulting Engineer.

CHAS. THOM, Chief of *Quadruplex Department Western Union Telegraph Co.*

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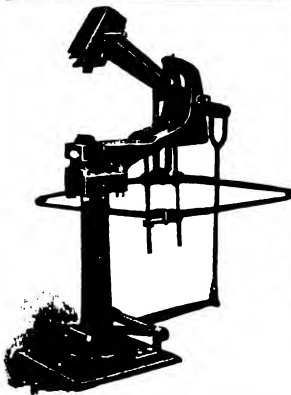
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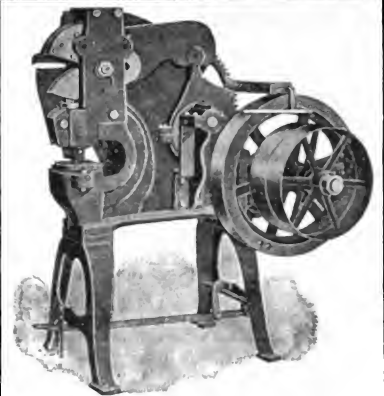
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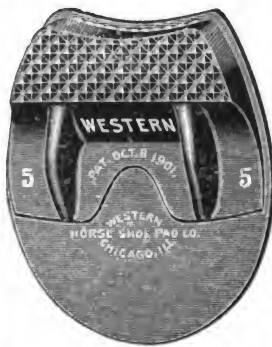
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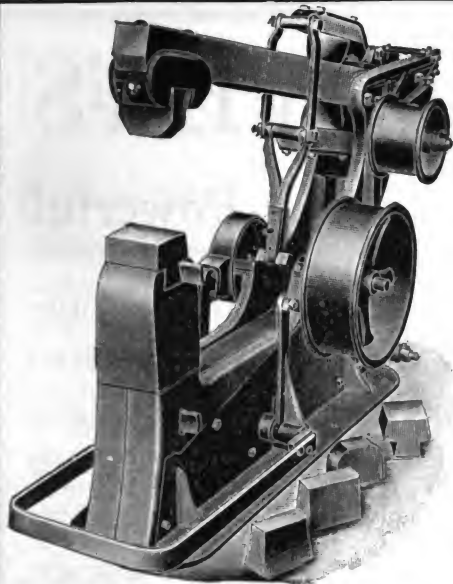
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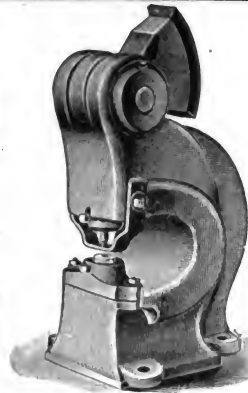
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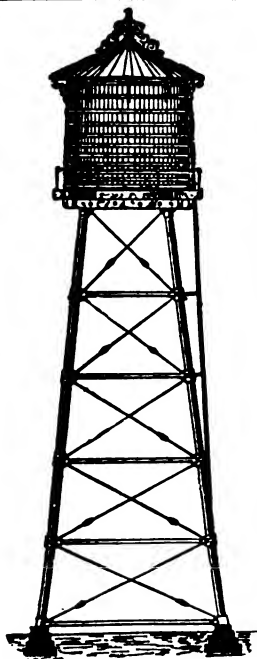
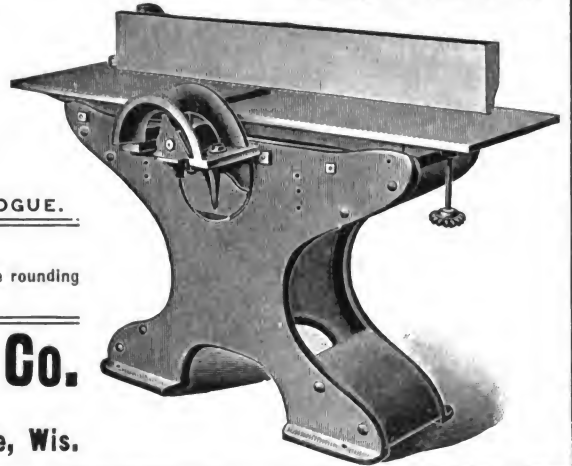
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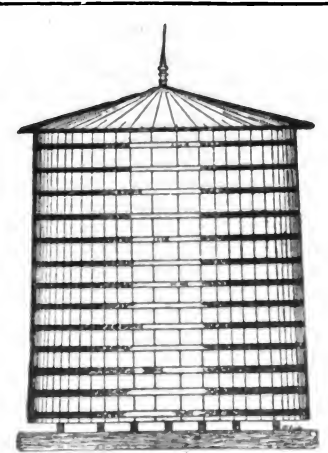
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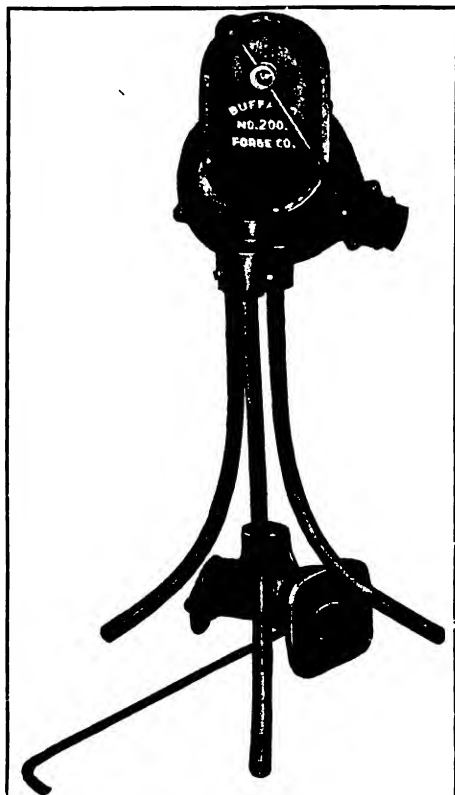
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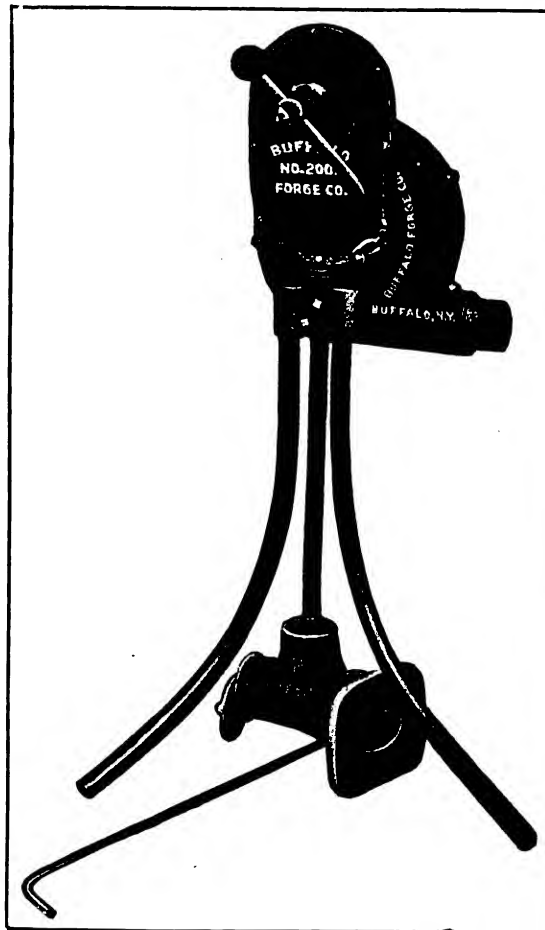
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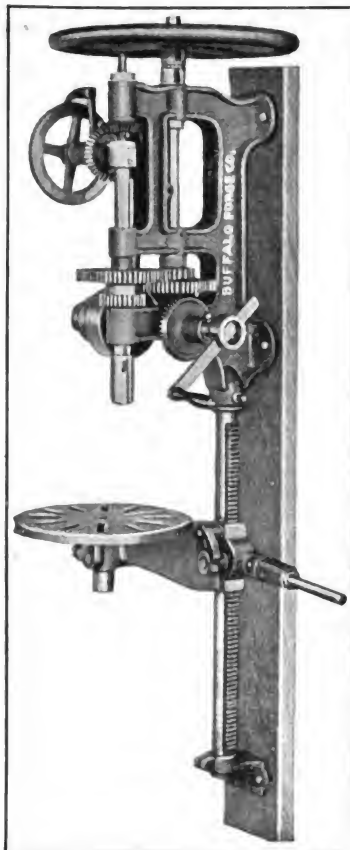
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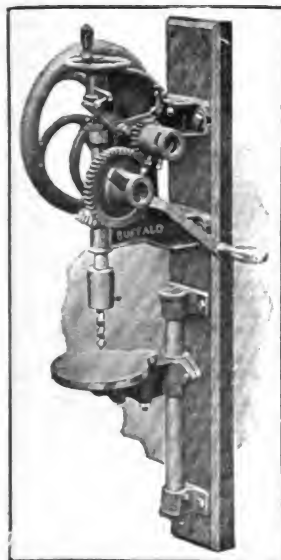
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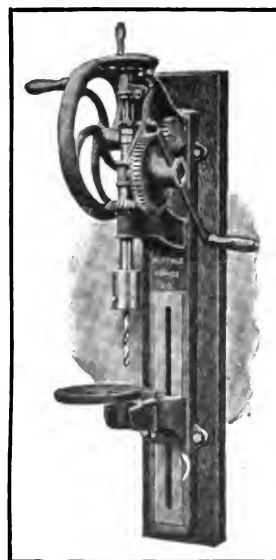
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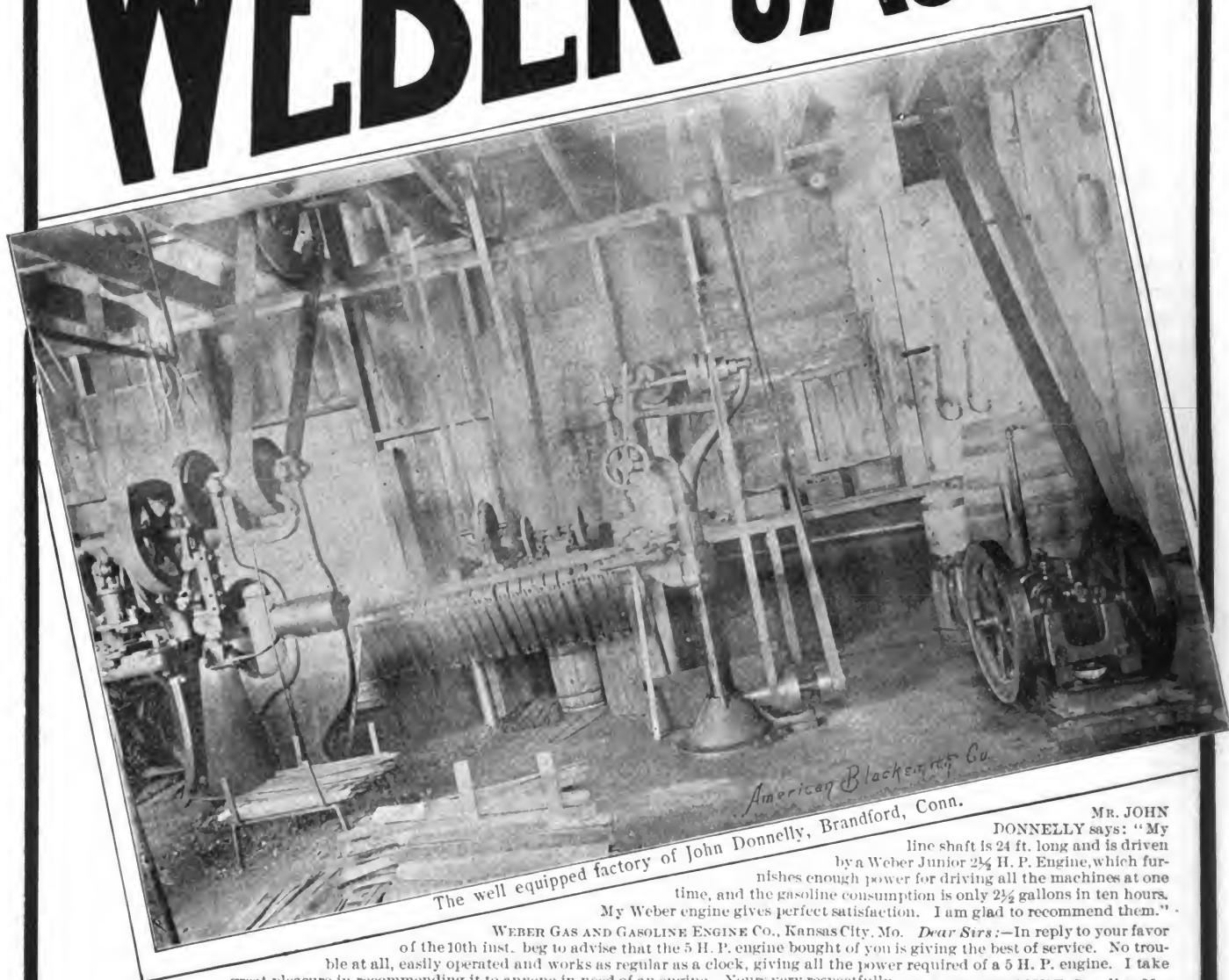


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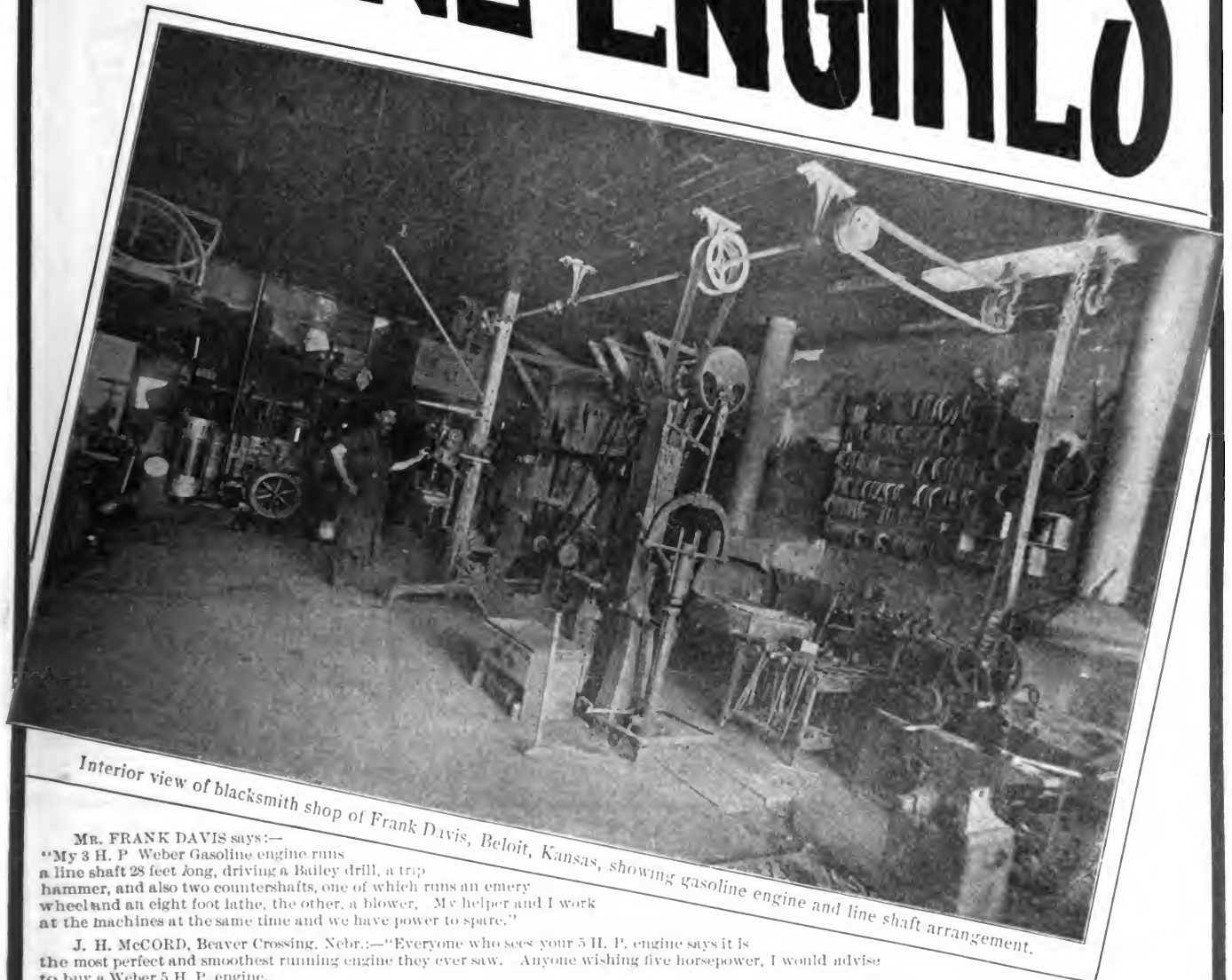
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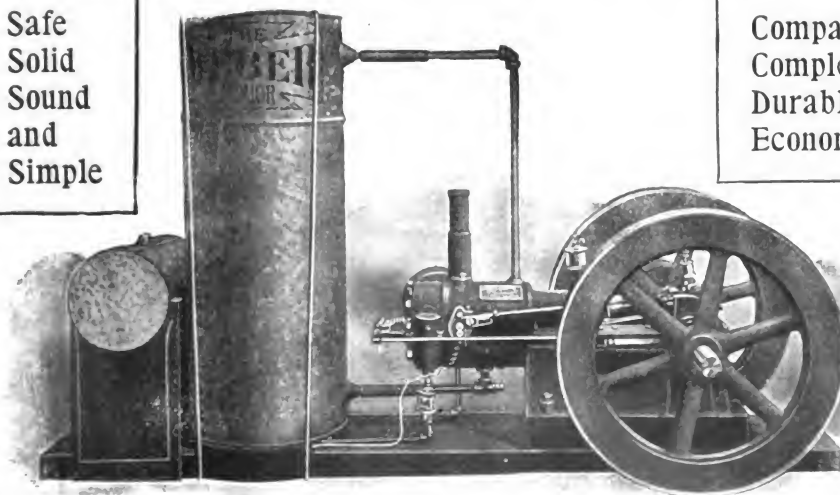
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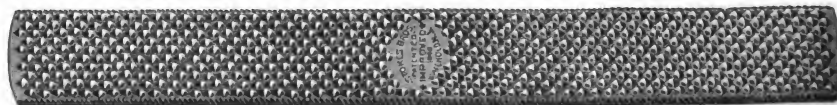
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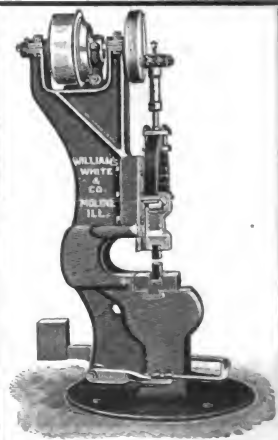
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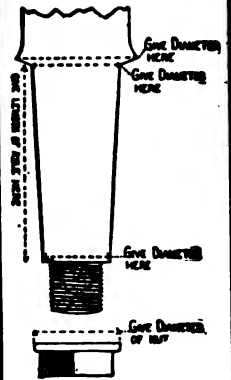




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THE AMERICAN BLACKSMITH

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The Lien Law Movement.

There are few readers of these pages who will not be vitally interested in the Lien Law movement told about on page 71. It deserves the active support of every progressive craftsman.

A Prize Contest Announcement.

As this issue will have a wide circulation among the craft, we desire to announce the offering of ten prizes, five dollars each to the ten persons who send in the ten largest lists of new subscriptions to THE AMERICAN BLACKSMITH, before May 1st, 1905. We give a cash commission for each new subscription, and this is in addition to the prizes. Sample copies will gladly be sent to any address, free of charge. Small clubs will win prizes. Will you try? Write to THE AMERICAN BLACKSMITH for full information.

The 1905 Souvenir Calendar.

By this time all subscribers of this journal have received a copy of our 1905 calendar, sent them with the compliments and best wishes of THE AMERICAN BLACKSMITH. Many readers have already written, thanking us for them and expressing admiration for their attractiveness. If there are any

readers who allowed their subscriptions to expire before January 1st, and thus failed to receive a calendar, they can secure a copy without cost, by renewing promptly. A small stock of them has been kept on hand to supply those who renew their subscriptions at this time. While the supply lasts, a calendar will also be presented to each new subscriber upon receipt of his order for a year's subscription to the paper.

The January American Blacksmith.

This issue of THE AMERICAN BLACKSMITH will be sent out to fifty thousand blacksmiths and wagon makers, just double the usual number. Some craftsmen, when they get this copy, therefore, will see THE AMERICAN BLACKSMITH for the first time. To these smiths we wish to say a few words about the paper and its policy.

In the first place, we desire all smiths who do not know the paper to get acquainted with it at once. Its reading pages, so subscribers say, form a mine of useful information on all craft topics. It is a significant fact that hundreds upon hundreds of our subscribers have paid for the paper five years or more in advance. If you would like to know what readers think and say about THE AMERICAN BLACKSMITH, we have a little pamphlet giving this information, and we are always glad to send it without charge to anyone. Ask for the testimonial folder.

This month's paper is a special number only in point of its double circulation. Every issue to come will have just as much solid shop reading matter, twenty pages of it, guaranteed, free from trade puffs, stale clippings and the like. The foremost craft authorities are regular contributors. Subscribers value the paper for its practical information, and its efforts to advance their interests. No smith can derive less than a dollar's benefit from its pages in a year—in fact, the motto which has been adopted for the paper is—"The biggest dollar's worth that goes into the smithy."

If you are not a subscriber to THE

AMERICAN BLACKSMITH, we should like to have you get acquainted. We want you to try the paper for a year. If you are a subscriber, you can assist in making the paper still better. How? By getting some new subscribers. Show your paper to some brother, or write and tell him how well you like it. Send us his dollar for a year's subscription, and we will reward you for your trouble. Kindly refer to page XX.

"Honest Dealings" and One Step More.

All subscribers of THE AMERICAN BLACKSMITH, as well as all craftsmen who may become readers of the paper in the future, are concerned with the policy of THE AMERICAN BLACKSMITH Company in protecting and advancing the interests of its readers by every possible means. One way in which this is done is indicated by the paragraph headed "Honest Dealings," which appears among the advertising pages of every issue. This month it will be found on page XIV. Read it carefully. THE AMERICAN BLACKSMITH guarantees the reliability of all its advertisers and prides itself on never admitting the advertisements of any who are not trustworthy. Our cardinal aim is to protect subscribers from imposition.

As an extension of this policy, we now insist that every reader of THE AMERICAN BLACKSMITH shall receive square dealings from all manufacturers and dealers of blacksmith goods with whom they may do business. Fair play for our readers from everyone, is our demand. Though happily growing fewer in numbers each year, there are firms with more or less capital, who, by sharp practices, override the rights of those who trade with them. Oftentimes the unfortunate part of it is that their unscrupulous dealings injure men who have not a great deal of money or influence to back up their complaints. We will take the part of our friends and subscribers who are thus injured, as explained in the next paragraph.

Within the past month all subscribers of THE AMERICAN BLACKSMITH have

been supplied with an envelope containing a number of pink stamps, as shown by the illustration on this page. Did you get yours? **THE AMERICAN BLACKSMITH** takes the stand that its readers must be treated squarely by all. Hence if you paste one of these stamps on the face of each letter which you write to any firm you expect to buy from, it will tell such a firm that you are a reader of **THE AMERICAN BLACKSMITH**, and that you thus have our influence back of you. If you paste one of these stamps on such a letter, and the firm proves unscrupulous, and you do not receive honest treatment, complain promptly to us. We will investigate the matter and use our influence to help you get satisfaction. Of course we cannot undertake to settle disputes with honorable firms, when differences arise, as from goods damaged in shipment and the like. We recommend that our readers use these stamps freely for this purpose. Fresh supplies will be furnished free of charge at all times. No one but readers of **THE AMERICAN BLACKSMITH** will be given these stamps and a supply of them will be presented to every new subscriber upon receipt of his order for the paper.

Bear in mind, however, that we do not guarantee the reliability of any firms except those whose advertisements appear in **THE AMERICAN BLACKSMITH**. But if you will use these stamps, we will do all in our power to right any dishonesty that you may suffer. Attach the stamp, not on the envelope, but on the face or inside of your letter, where the person who reads the letter will see it.

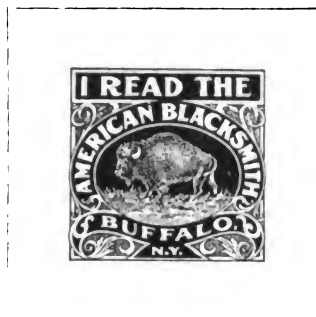
By using these stamps freely on all letters which you write to our advertisers, and to all dealers and brother smiths, you acquaint them with the fact that you are a subscriber of the leading blacksmith and wagon building paper, and you thus "stamp" yourself as progressive and up-to-date. A free use of these stamps will advertise yourself in this way, and oblige us also. They will also attract notice and secure prompter attention to your letters. Do not forget to drop us a postal for a fresh supply when these are gone.

Baxter Talks About Betterment.

It is an out-of-the-way shop, to be sure. One wouldn't stumble on it in a day's hunting if he didn't know just exactly how. You turn the corner, walk straight ahead about as far as a good pipeful will carry you, then to your left, a bit further cross lots, and the second shop up the next street is it. Knowing this, you can't miss it.

And Baxter's shop is always full of work, for he is a good mechanic. And as he is also a big-hearted fellow, one can usually find some of the boys there for a chat of a minute or two, as Baxter plugs away, "trying to scrape enough to pay Jim Jobber," as he is wont to say.

As I strolled in last Monday, Baxter was saying to Grady, the carpenter, "I tell you that a blacksmith has got to be a pretty pert chap to make a good thing out of it now-a-days, and just being a good mechanic isn't everything. He has got to know how to keep books, how to advertise, and he has got to be the shrewdest kind of a boy when it comes to collecting the money. He has got to be a business man and mechanic both, so there you are. Often strikes me that a mighty nice business could be built up by two men of the right sort, one of them to tend to the books, buy the goods, drum up the custom, sell the



stuff that is made, collect the bills, and the likes of that, and the other to tend to the blacksmithing and wagon work, pure and simple."

"Is that what's the matter with so many of these smiths you see around, barely living from hand to mouth?" asked Grady.

"There you've struck it. What is the matter with them?" Baxter deftly arranged the glowing coals about his iron, and began turning the blower. "Blacksmiths are good fellows, one and all. So I've found it, and I've known lots of them. But they seem born with a jealousy for their neighbor smith. For my part I never object to my brother smith making a few more dollars than I do. Glad of it, in fact, and I certainly never would make the mistake of cutting my prices because he did. What the boys of the craft need today more than any one thing is to get to know each other. When each comes to know the other and finds out he's not such a bad lot after all, but a brother in truth, then it is but a short step to co-operation, a raise in prices, better feeling and better wages all around. Let the boys get together, learn to know each other

and then form associations for their mutual benefit, so their families will have some of the comforts of life.

Grady asked, "Why don't they do it?" but the answer, if there was any, was lost in the shower of sparks which Baxter drew from the iron as he joined it up in a nice, clean weld.

A Very Handsome Wrought Iron Lamp.

The accompanying engraving shows a lamp skillfully executed in wrought iron. The bands at the top and bottom are of pierced sheet iron. The cresting, which crowns the lamp, is of hammered sheet iron. The most notable feature, the rich clusters of foliage which terminate the upper end of the projecting uprights, are of hand forged wrought iron. Note the care and exactness with which all the terminations of the scrolls of the strap work are wrought out. This lamp is to be hung in the Teachers' College of New York City, and is an example of the ornamental work turned out by Messrs. Richey, Browne & Donald, to whom we are indebted for the photograph of this artistic piece.

The Gas Engine.—5.

E. W. LONGANECKER.

Common Troubles.

The rule is that the gas engine has to be turned by hand to get the first impulse, and if all the conditions are not just right, the impulse will not occur on the first turn. Considerable turning is necessary with some operators before a start is made, consequently difficult starting of the engine is one of the common troubles. Easy starting depends largely on the operator's knowledge of the conditions necessary to make an easy start. Many persons become so expert at it that they know when they take hold of the wheel that the engine is going to start the first turn-over. The three important things an engine requires for an easy start are a good compression, a well-mixed initial charge of fuel, and a good igniting spark. You may have any two of these without the other, and the chances are, you fail to make a start. You have already been told in these pages what is necessary to secure a good igniting spark. Compression in the gas engine depends on the condition of the valves, cylinder, piston and rings. A good compression can not be had with leaky valves or leaky piston rings. The rings can not hold the compression if they are worn too small for the cylinder, or if the grooves in the piston in which they work are not true, or if the cylinder is badly worn. A blowing, sizzling, or

coughing noise in the cylinder indicates a leak through the rings. It may be sufficient to cause hard starting, and it may not. But even if it does not interfere with easy starting, it may be a condition that is wasteful of fuel. It is a condition that may sometimes be overcome by feeding lubricating oil more freely for a short time. It may be the result of a badly-lubricated piston. Sometimes it is due to a clogging up of the ring beds or grooves with burnt carbon, causing them to stick tightly or work sluggishly. With many operators ring trouble is one of the common troubles and needs the right kind of attention immediately.

Leaky valves is another common trouble, and is due to either a bad seat, clogged with dirt (burnt carbon), corrosion of the metal, a fire crack through the seat, or a worn condition of the seat, valve stem, or its guide. The guide is usually a sleeve through which the stem of the valve passes. If the seat is dirty or corroded, grinding the valve with fine emery and lubricating oil on the seat, until a good seat is secured, is necessary. This is done by taking out the valve pallet, putting oil on its seat, then sprinkling some emery (coarse at first, and then fine), into the oil and seat, after which the valve pallet is dropped into its seat and with screw-driver bit and brace the valve is turned and ground, until it shows a good bearing seat all around. Take time enough to grind a good seat, if it takes three hours of turning with brace and bit. If a seat is cracked, nothing but a new casing, making a new seat, will answer. If the stem and guide are badly worn, both need renewing.

Another very common trouble is insufficient valve action. This causes less power than the engine is capable of developing and a consequent waste of fuel. It also interferes with easy starting. The fault of this trouble is not in the valves, but in the mechanism which operates them. Usually it is found in the cam or cam roller which operates the valve, or in both. They become so worn that they do not open and close the valves at the proper time, nor lift them high enough from their seats. The same trouble may and often does arise from a worn condition of the gear which drives the cam shaft. Trouble resulting from worn conditions of these parts is far more common than is generally supposed. If an engine does not start easy, run economically, or develop its full power, some such worn part as above described may be suspected. If

the cam and cam roller that operate the exhaust valve are worn very much, it can not open as early as it originally did, nor lift as high from its seat, consequently the pressure within the cylinder is not freely relieved at each exhaust as it should be, but remains choked more or less. This prevents the cleaning of the cylinder from burnt or foul gases at each exhaust, and the pressure and burnt gas remaining in it interfere with the fresh incoming charge so much that it often fails to ignite entirely, or if ignited, the resulting explosion or pressure is very



A HANDSOME LAMP EXECUTED IN WROUGHT IRON.

weak. The exhaust valve should open at about four-fifths the working stroke of the piston, and remain open the remainder of that stroke and for the entire length of the exhaust stroke, closing just as the piston is starting on its receiving or inhalation stroke. The receiving valve should open at about the same instant as the closing of the exhaust valve.

Another common trouble is starting the gas engine in a cold atmosphere. The trouble is due to the slow vaporization of the gasoline when the air, inhaled by the engine, is below the freezing point. Cold air will not readily take up gasoline vapor and mix with it, but warm air vaporizes it as soon as it

comes in contact with it. The remedy for cold weather starting is to keep a stove in the engine room for the purpose of heating the air, and a gasoline blow torch for heating the interior of the cylinder through the spark or some other port on out-door engines.

A condition that is frequently met with, which might be regarded a common trouble, is the cam shaft out of time. This usually occurs in the hands of a new operator. He thinks he has occasion to separate the gear that operates the cam shaft, and as he does not understand how to time the engine, or that the gears are generally marked, with some punch mark or character on the cog and groove that should meet, he gets them together wrong and the result is that the spark and valves operate at the wrong time.

It is not an uncommon thing to find persons trying to operate their engines without fuel. I have made a number of trips to see engines that would not run only to find that there was no gasoline in the supply tank and the operator had overlooked it or forgotten to examine the tank at all. The same thing happens where gas is used for fuel. When shut off, it is not always turned on when the operator thinks he is ready to start. But if he operates long enough he learns one thing, that his engine does not start till he turns on the fuel.

Possibly one of the most frequent sources of trouble is carelessness in handling the engine. It is a very common thing to find gas engines stuck away in some dark corner, all covered with dirt and grease, and litter piled around them so that it is practically impossible to care for them properly. Many operators have their engines literally soaked in oil which would not be so objectionable if they would wipe off the surplus once every 24 hours and clean the engine thoroughly. But as a rule, the oil is fed freely and the engine is never cleaned, and it becomes a catch-all for every particle of dust, dirt and grit. In this condition gears will cut out, valves and piston rings gum up, bearings heat, cylinder and piston wear rapidly, valve cams and cam rollers wear down, lubricators, air and exhaust passages choke up, and a dozen other things happen to put the engine out of operation. There is the other extreme of not oiling or lubricating enough, which is just as bad, or worse. More oil than necessary is more desirable than not enough, provided the engine is kept clean. We might enumerate or give the cause and remedy of

every trouble that has ever been met with and yet fail of our purpose if we did not recommend, in fact urge, every operator to clean his engine thoroughly

load on the engine and increase the cooling circulation. A knock is often due to a loose crosshead or wrist box, a loose fly wheel or pulley.

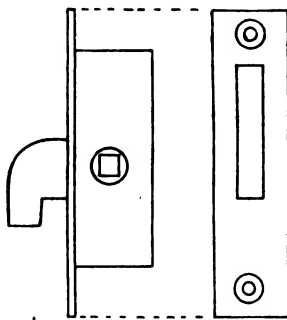


Fig. 1.

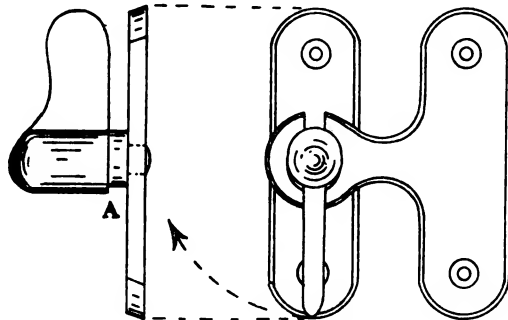


Fig. 2.

TYPES OF END-GATE FASTENERS FOR WAGONS.

every day. You avoid and prevent trouble by cleaning; besides, by going over your engine in a cleaning process every day you become familiar with all its parts and their functions. You find and remedy all irregularities in their very beginning.

A very common trouble in the gas engine is a knock somewhere about it, or a pound in the cylinder, the cause of which is not always easy to locate. But if it is a heavy pound in the cylinder, which comes on after the engine has run under a load for a short time, and when the cylinder is quite hot, it is caused by some part in the igniting chamber get-

Adjusting a box properly is considered by many a skillful accomplishment. There is probably more common sense than skill necessary. Always adjust a loose box promptly and watch it closely to keep it from heating. When you hear a knock about your engine, never rest satisfied until you have located and removed the cause. Look for a loose fly wheel or pulley wheel. They are frequently the cause of the knock. Loose fly wheels should be promptly and thoroughly tightened or fastened to the shaft.

(To be continued.)

A Number of End-Gate Fasteners For Wagons.

J. LAWRENCE HILL.

The object of the writer is to enable the small wagon builder to choose the best fastener for the particular wagon he is building. The following designs are taken from wagons in use, and where possible, due credit is given the makers, but it is not easy to find out from whom the styles originated, unless they are patented. Some of the designs were picked up in France by the writer.

Fig. 1 is an ordinary box lock with a lip to it. This is used when the gate fits inside of the body. The lip, when locked, prevents a side motion, by engaging with the plate in the corner pillar. It is quite a strengthener to the rear end of the body, but it has this disadvantage, that in being sunk into the gate ends, it makes a place for water to get into and so rot the wood. All the other illustrations prevent this, but they all look more or less clumsy, because they have to be attached outside the body.

In Fig. 2, we see the end and side view. At first sight it appears as if the handle was all the bearing there is, but at A will be noticed a shoulder, so that when closed, the handle holds the bottom and A holds the top, making a strong and neat arrangement. Fig. 3 is the old

style spring and needs no comment, except to say that it is sometimes fastened on to the side panel, but more often on top.

Fig. 4 is a style for top wagons where the doors are hinged to the side pillars and extend from the floor to the roof. It is made of $\frac{1}{2}$ -inch plate. The hooks are part of the same plate, being punched out and bent as shown. The spring is bent much more than the hooks, as this will give pressure and prevent rattling. To open, press the knob on the spring towards the door and raise it up above the first hook. The door will then open. The other hook—the one nearest the rivet—is to keep the spring in position when the doors are opened. Fig. 5 is another style used for long doors.

Fig. 6 is one of the strongest fasteners made. It can be used either with a gate that fits inside the body, or one that goes outside the full width of the wagon. The plate A is sunk into the side panel. B is a stud over which the flap D fits. E, the lock, works on a

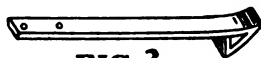


FIG. 3

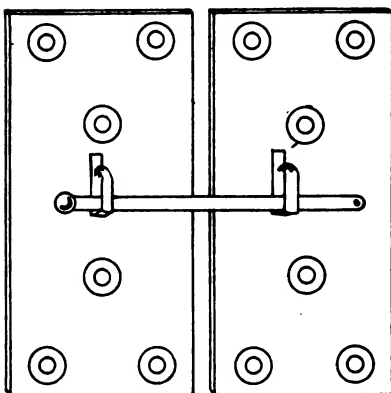


FIG. 4



Figs. 3 and 4.—TYPES OF END-GATE FASTENERS FOR WAGONS.

ting hot enough to fire the charges too early, while the piston is coming up on the compression stroke. The remedy is to clean out the compression space; remove any sharp projections of iron or chunks of burnt carbon. Put a lighter

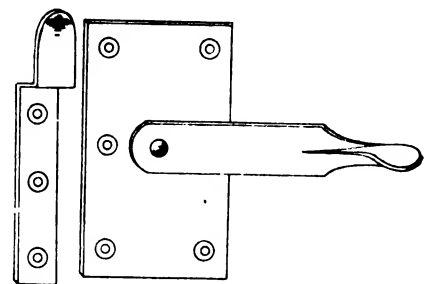


Fig. 5.

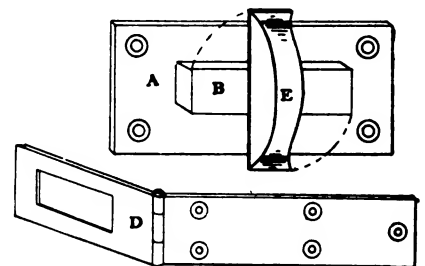


Fig. 6.

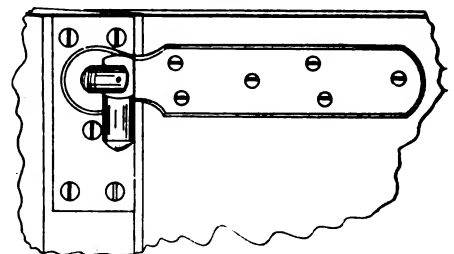


Fig. 7.

Fig. 5, 6 and 7.—TYPES OF END-GATE FASTENERS FOR WAGONS.

pivot and when in the position shown prevents D from coming off. It can now be seen how strong this style is. With the other end of D fastened outside the end gate, D over B, and A bedded and

screwed into the side, it is almost impossible to break it open.

Fig. 7 can only be used when the gate fits in between the sides. On the shed fit a piece of rubber to prevent the door plate from rattling. Fig. 8 is another neat looking catch. A shows the side

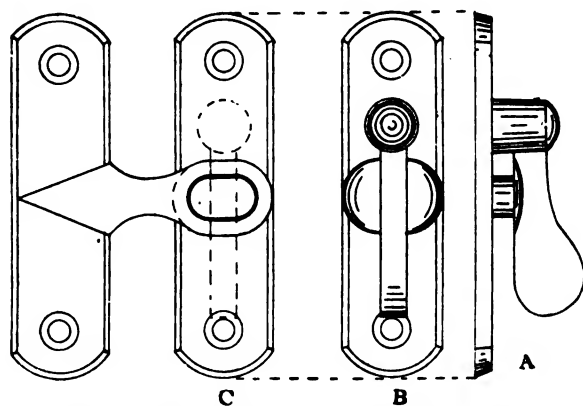


Fig. 8.—TYPE OF END-GATE FASTENER FOR WAGONS.

view of B, C is the same as B, but shows the stud with the door part of catch in position.

Behind the lip of the door-part in Fig. 9 is a spring which presses the lip against the catch and prevents rattling. This style is patented by C. C. Cowles, New Haven, Conn., and with Figures 8 and 10 is made and sold by them. Fig. 10 is not a difficult style to forge and makes a strong and easily operated fastener for slat-side wagons.

Fig. 11 is a very common style used on wagons for heavy work and on light grocery delivery wagons. A is a leather strap. On the other side of the wagon a buckle is used, so that the door can be lowered to any angle. On the opposite side of the wagon, a wood pin fits into a loop in the end of the leather;

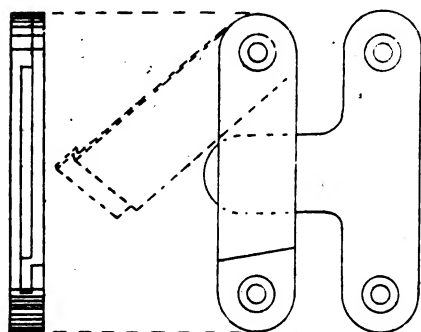


Fig. 9.—TYPE OF END-GATE FASTENER FOR WAGONS.

this comes up against the staple and keeps it in place.

Fig. 12 is rather a common style. The objection to it is that it rattles, but if a $\frac{1}{8}$ -inch hole is bored $\frac{1}{2}$ inch deep into end of side panel or pillar, as the case may be, and a piece of rubber fitted in, so that it projects a little beyond the

end, the door will then press against it and can never rattle, and the rubber can easily be replaced at any time.

Several Pointers on Brazing.

JOHN W.

Formerly, to the average blacksmith, a broken casting was worthless except for remelting, and was thrown into the scrap. The ordinary blacksmith was sure a broken part could not be repaired unless it could be welded or riveted together, and he looked with contempt upon the suggestion that a broken casting or a thin or intricate forging could be substantially repaired by brazing, and in many cases be made even stronger than before it broke, simply because he

did not know how to unite metals and alloys. But the brazing of bicycle frames, wires for rubber tires and other things as well, has brought brazing more to the front, and the progressive smith no longer derides its use. The frames of locomotives and the frames and parts of some machinery are of wrought metal and the proper thing to do with them is to weld the parts together. But the frames and parts of most other machinery are of cast iron, and when broken can be repaired by brazing and in many cases be made stronger than before they were broken. The only secret about brazing applies equally to welding, that is, absolute cleanliness. In welding, it alludes more particularly to the fire, while in brazing it relates more particularly to the parts to be joined. If the break is new and clean, clean off all paint, rust, grease or dirt around the break, either by burning or with a file, and if rusty in the break, cut the rust with hydro-chloric (muriatic) acid, and then pick it out with a sharp scratch awl and a wire brush. A substitute for a brush is a bundle of small wire. Now wash the break thoroughly with borax water, using the wire brush, and clamp the parts together as far from the break as possible. Small parts may be bound together with wire. The object of having the bindings as far as possible from the fire, is that if they are in the hottest part of the fire they get hot first and are lengthened and will allow the casting to get out of adjustment, unless the casting is properly blocked up so it cannot move. If clamps are used, they may be tightened a little as they

heat up and loosened afterward to prevent undue strain; it is well to rivet the parts together if it can be done.

Heat up large pieces that have sharp

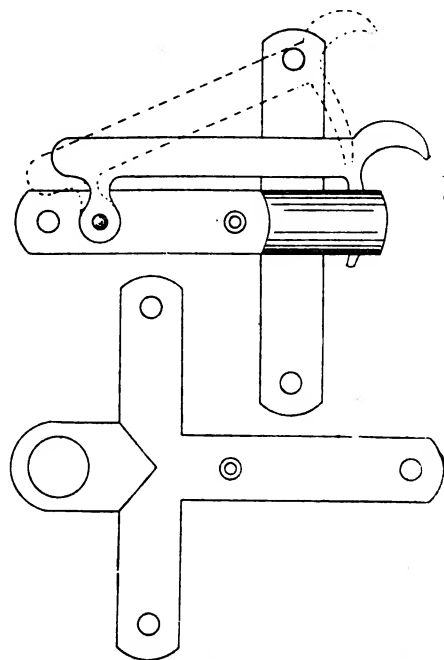
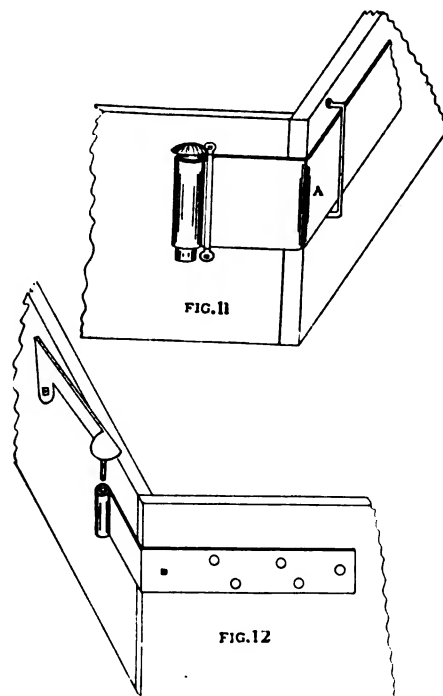


Fig. 10.—TYPE OF END-GATE FASTENER FOR WAGONS.

corners or thin flanges slowly, that they may not burn off, and for large castings a top fire should be built, preferably of charcoal. When red hot, put on powdered or pounded borax, seeing that it flows entirely around and into the



Figs. 11 and 12.—TYPES OF END-GATE FASTENERS FOR WAGONS.

broken joint, and when it is melted, put on the brass (and continue to put on borax as the brass is melting) which may be small pieces of wire or sheet

brass. For small brazing, filings of these are preferred. There is what is called "Spelter Solder" to be had at machinists' supply stores, which is better but not indispensable. As the

will not hurt, but will rather help his reputation for "doing things."

It is often very true that one never knows what he can do till he tries, so I believe all smiths would find it to

appearance imaginable. Go inside and you will find everything topsy-turvy, the anvil block sitting in the middle of a big scrap pile, the small tools lost and the shop too dark to find them. How is it in cold weather? We have heard it said the coldest place on earth (excepting a sawmill), is a blacksmith shop.

The above conditions apply to a very large per cent. of the shops throughout the country, or did a few years ago, when the writer was a live blacksmith. Such should not be the case, and I am happy to say we are getting out of the old rut by degrees. It costs but little to make the shop warm. The horses will stand better to be shod, you will stand better in the community, customers will enjoy calling to get work done. A blacksmith's life should be made just as pleasant as possible, as it is hard enough at its best.

Now, when you have a little spare time, see if you can't arrange your tools to be more convenient, have a place for everything and keep it there when not in use. Customers appreciate a well kept shop, and will often express it when in one, but if they are in Tom Tardy's, they may not say anything about it. When they go into a comfortable, well-kept shop, everything in its place and THE AMERICAN BLACKSMITH on file, they say to themselves, "Here's the place to get your work done



AN ENGLISH COACH OVER ONE HUNDRED YEARS OLD.

brass melts it is well to work it into the joint, and a piece of brass wire bent and flattened at the end is a good thing to tap and work the brass and borax into the joint. It is well to let the casting rest on the blocks until the joint has cooled down, withdrawing in part or whole the fire, and if there are two breaks in the casting, cool off the first after the brass is hard, as too much heat puts an undue strain on the casting. Copper is sometimes used to braze the joints of fork and other ferrules, but its melting point is too high for satisfactory use with cast iron.

There are various preparations on the market for the brazing of cast iron. Some of these I have tried with satisfaction, but I cannot ignore the idea that there was more in the directions that accompanied them in regard to care and cleanliness than there was in the flux sold, as I have never had any trouble in brazing cast iron when I followed the directions set forth above. I do not say but that there may not be some grades of cast iron that will not braze with borax, but I have not found them yet. Filings from coin silver is a good thing to braze fine and delicate parts with.

In my next I will give some examples of the brazing I have done, to show the extra money the blacksmith may take in if he knows how to braze, and it

their advantage to see what they can do in the way of brazing cast iron, first experimentally and then on some job.

Lack of Order in Blacksmith Shops.

L. VAN DORIN.

I would like to write an article on the lack of order in blacksmith shops. In



A CURIOUS BLACKSMITH SHOP IN NAPLES, ITALY.

the first place, one would think we use a building that could not be appropriated to any other purpose, the outside presenting the most disagreeable

quickly, properly and satisfactorily."

Appearances count for a great deal in this life, and it is surprising sometimes to find what a large effect apparently

insignificant things have, such as neatness, cleanness and order in the shop. Indeed, I know of no better advertisement for any business.

Two Unique European Views.

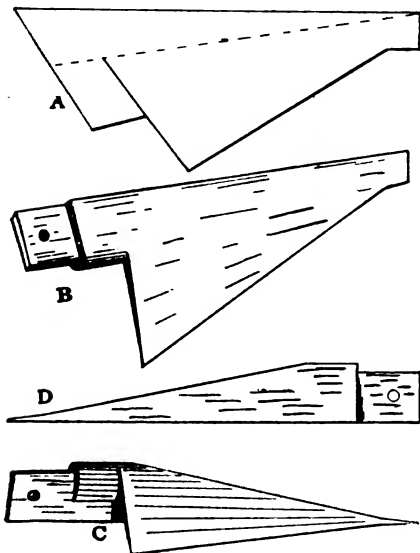
The accompanying engravings show a view of an Italian blacksmith shop in Naples and a carriage or chariot built in 1800. The picture of the smith shop, if such you may call it, is no doubt the more interesting to our readers. It will be seen that this smithy is directly on the sidewalk, and that horses are shod at the curb. Over the shop, it is very evident, is a laundry, and next door, so the photographer tells us, is a macaroni factory.

The vehicle shown in the other view is an old English carriage, and is now kept only as a relic. Notice the sword case in the rear of the body. This case opens from the inside of the carriage, so as to enable the occupants to protect themselves from the attacks of highwaymen who were numerous in the days of the coach's usefulness. Another peculiar feature of this unique coach is the high rumble at the back, also the skirt seat-fall and suspension.

Making a Slip Share.

GEORGE NABLO.

The plow, no matter what other machinery for tilling soil is employed by the farmer, is still the uncrowned king of farming implements. It is among those inventions that have maintained their place to this day. It is



VARIOUS STEPS IN THE MAKING OF A SLIP SHARE.

almost impossible to think of carrying on successful tilling of the soil without its use. It may vary somewhat in shape, size, etc., so as to be best adapted for the soil of the locality, yet all work on

the same principle. My experience of over forty years has been chiefly with the long Scotch plow with cast iron or steel moldboards, which measure from end of sole to point of share three feet and over, and are pointed with wrought or steel slip shares of the pattern shown at B, never exceeding seven inches in the widest part of the wing. In the very stiff clay soil of this country, only furrows of nine inches are turned and a wider share would not work. Such a thing as a plow lay we don't know.

I want to make a few remarks as to the making of a good slip share. It's not so easy as some may think, and even when made, it is questionable if the plow will run satisfactorily, unless certain rules are observed. Welding the share plate and the landside part of the share is one way, but it takes a good and practical mechanic to make a good sound weld all along the share. Hence, the better way is to procure a piece of soft steel plate and cut it in the shape of A, having it wide enough to admit of bending the landside on, instead of welding and working the bent part to a square corner on top of the whole length. The next thing to do is to turn a long hook on the share, which clasps the cast iron point of the plow and which is best done by slipping the share on the cast point and bending the hook by hammering it, while hot, around the point, as at B. When the share is thus fitted and runs in a level line with the sole, both at the bottom and the side, then the wing of the share is hammered to a cutting edge and a point worked on. It is well, in clay soil, to weld a piece of an old horse rasp on the point, as it will wear longer. The polishing can be left to the farmer to do, which takes about a day or two of plowing. A share made of 7-16 by 9-inch soft steel stock will wear from two to five years in clay soil, but will need to be laid with steel on the wing about once a year and sharpened very frequently. After a year's wear, the share gets worn too short and narrow and has then to be laid all along the wing and point with spring steel to bring it to its original size, and thus kept until worn beyond redemption.

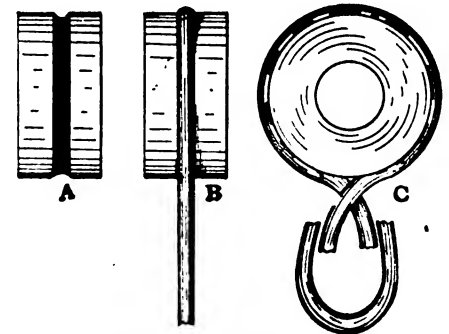
Now, a few rules should be followed in making and setting a plow share to insure a good running plow. First use a plate of sufficient thickness that will fit the offset on the mouldboard and the sole. Then when finished, have a gradual taper from top to point, as shown at C, the mouldboard side, and D, the landside of share. Second, the hinge of the share must be drawn to a gradual edge

and set so as not to rub on the soil behind the cutting edge. Third, the share must run parallel with the sole of the plow, both at the bottom as well as at the side. If these rules are observed, the plow will run to suit the most exacting of plowmen.

A Bolt Heading Tool of Neat Design.

W. H. MORRIS.

The accompanying engravings show a bolt heading tool of a new (at least to me) design. A, in the engraving, shows a side view of the head of the tool.



A BOLT HEADING TOOL OF NEAT DESIGN.

This is forged from a piece of stock of suitable size and about one or one and one-half inches thick. This piece is fullered all around, as shown at A. Now take a rod of the necessary length, bend it as shown at B and C and weld. Drill a hole of the size wanted in the head of the tool and it is finished.

Sharpening Plow Lays.

A. BRUTON.

I might say here that having been brought up on a farm, I know how to use a plow as well as to sharpen one. Too many smiths, in sharpening, pound or draw from the top side; this I would not do, for it leaves the lay rough, no matter how careful you may be. The bottom is the right side to draw from, or the factories would not do so. Again many men leave a plow lay warped so that you cannot get it back on the plow. The reason for this is they use too great a heat and too heavy a hammer, or they strike uneven blows with a round hammer. I always keep my hammer faced up, and never heat my lays too much, and I never use a sledge unless on a fuller, in which case it forces the edge out instead of springing the lay. Holding a lay level and solid and straightening up as you go along helps to keep it in shape. Of course the best of smiths will run across a lay occasionally that will spring simply from heating. I always reheat after sharpening and then set it on a leveling table, straightening it while hot, always making it a

little more than straight so as to leave room for contraction when cooling. You will find this very satisfactory.

A Few Forge Fire Facts.

W. O. B.

As the success or failure of work done at the forge depends largely upon the fire, a short talk on it will perhaps be of value and interest to the readers of THE AMERICAN BLACKSMITH. It is not

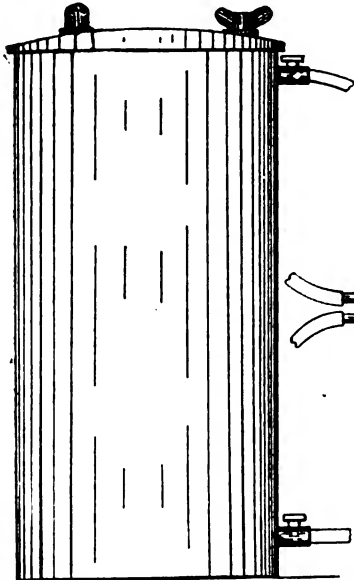


Fig. 1.—OIL BURNER AND TANK AS CONSTRUCTED BY A CORRESPONDENT.

the purpose in this article to tell anything new to the old smiths, but rather to tell something very old to the new smiths and the apprentices.

It is understood, of course, that the young smith knows how to build his fire, how to bank it, and also to keep it clean, but a hint might be given here, that is not generally known—when banking a fire that is to keep for some time, bury a block of wood in its center and then bank as usual.

The young smith is more liable to give his fire too much air than not enough, in fact, it is a most common fault with the beginner to think that the more air the hotter the fire, and, of course, the easier and quicker to work the metal. Nothing could be more incorrect or farther from the reality.

Air is blown into the forge fire to supply it with oxygen, which the air contains. This oxygen is consumed by the fire. If too much air is supplied, all of the oxygen is not consumed and oxygen will affect heated iron. When a piece of heated metal comes in contact with the air, the oxygen unites with the heated surface and a scale of iron oxide is formed. The hotter the metal the easier is the oxide formed and therefore to obtain the best results, no more air than is necessary should be supplied.

If just enough air to make it burn properly is blown into the fire, all the oxygen will be burned out and very little scale formed while heating. The surplus air also cools the fire.

The fire should always be watched and kept burning brightly, and should be changed as often as necessary to keep it from getting dirty. Coke and not coal should be burned in the part of the fire where the heating is going on.

Large pieces of work should be heated much more slowly than the smaller pieces, as the outside will become hot and be in a condition to work while the metal in the center is comparatively cold. Allowance must be made to heat a large bar thoroughly, as to obtain the best results the bar must be worked evenly, and this can only be accomplished by heating it evenly. Uneven heating will result in the outside or surface of the bar sliding over the center or improperly heated portion.

The Tempering of Small Tools.

L. F. STILLIANS.

Forge the tool to the shape it should be. Then dip your hammer in water, and while the tool is hot, chill the top of it with the hammer. Repeat this three times. Have a sufficient amount of raw linseed oil handy to cool the tool off and then heat again until red. Now wait until the heat disappears and dip the tool in the oil until it is cool, repeating this three times. This will take out all the hard spots. Now heat the tool

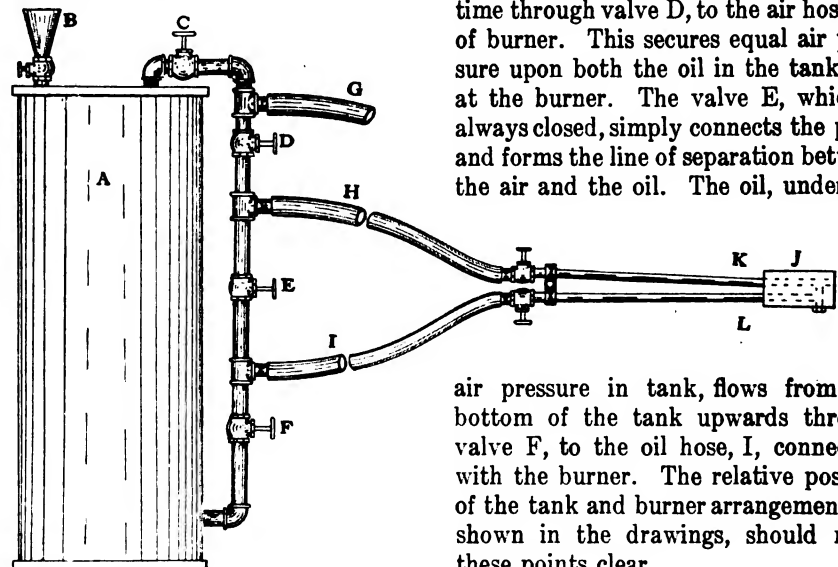


Fig. 2.—OIL BURNER AND TANK AS USED IN RAILROAD SHOPS.

to an orange color and plunge it in the raw linseed oil until cool. You now have the tool as hard as it can be made and not be cracked. Next polish the tool bright. Then take a heavy piece

of iron, heat it until it is red and lay the tool on this. Now draw the color. For springs draw to green; drill bits to wine color; for butcher knives, bright red; for wood cutting tools, gold red and blue mixed. Always use good steel, worked at an orange heat.

An Oil Burner For Brazing.

A correspondent writes: "From Mr. W. B. Reid's description of an oil burner in the August number of THE AMERICAN BLACKSMITH, I built an oil burner, only on a much reduced scale, to do brazing, but I could not get it to burn properly. When I applied a little pressure, the flame would go out. I tried crude oil, and also gasolene, but I missed it somewhere. I show herewith, Fig. 1, an illustration of my burner and tank, and ask someone to show me my mistake, or tell me how to make a burner to do brazing with."

Mr. Reid's Answer.

In reply to a correspondent's request for details of the oil tank and burner, which I referred to in my article in the August AMERICAN BLACKSMITH, will say that I trust the following may simplify the construction and use.

The 26-gallon tank, A, Fig. 2, is an old, locomotive air cylinder; the pipe fittings and attachments are such as could be found in the railroad shop store-room. B is a valve with an oil filler soldered to it. This serves also as an air exhaust from the tank. Valve C admits the air direct from the air line, G, to the tank, the air passing at the same time through valve D, to the air hose, H, of burner. This secures equal air pressure upon both the oil in the tank and at the burner. The valve E, which is always closed, simply connects the pipes and forms the line of separation between the air and the oil. The oil, under the

air pressure in tank, flows from the bottom of the tank upwards through valve F, to the oil hose, I, connecting with the burner. The relative position of the tank and burner arrangements, as shown in the drawings, should make these points clear.

The burner, J, is a piece of $2\frac{1}{2}$ or $2\frac{1}{4}$ -inch round brass, into which $\frac{5}{8}$ -inch holes are drilled. The air hole, K, passes straight through the metal; the oil hole, L, about three-fourths through and is then diverted at right angles into the air passage by another hole drilled

vertically from the surface. A small set screw plugs the end of this hole, which is useful in allowing the burner to be cleaned when necessary.

Five or six feet of $\frac{3}{4}$ -inch pipe attached to the brass cylinder, with valves to

T, the lower arm being plugged by a set screw, making it easy to clean the air passage when obstructed. The air and oil converging into the small chamber A, of the cap B, Fig 4, pass together through the $\frac{1}{8}$ -inch aperture, C, of the

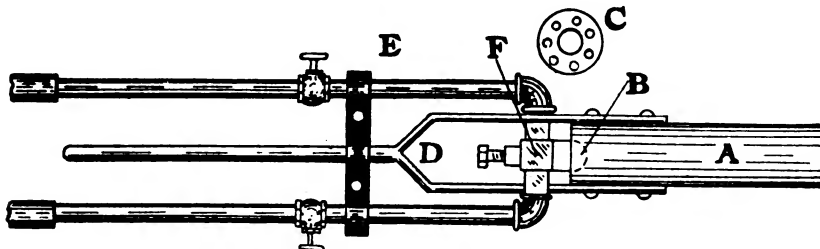


Fig. 3.—SHOWING DETAILS OF OIL BURNER FOR BRAZING.

regulate the air and oil, as shown, complete the burner. This apparatus is not very well adapted for brazing, as the crude oil used as fuel contains too much carbon for this purpose.

An oil burner of lighter proportions suitable for brazing purposes is shown in Fig. 3. The part A is a piece of 2-inch copper pipe, 8 inches long. The lower end of this pipe is flanged as shown at C, having a number of $\frac{1}{8}$ -inch holes drilled around the flanged part to admit air into the pipe for combustion. The larger central hole fits over the small cap, B, the parts being held together by the fork D, which is $\frac{1}{4}$ -inch round iron, flattened at the ends, rivetted to the copper pipe and clamped at lower end to the air and oil pipes as shown at E. The construction and purpose of the

cap into the larger copper pipe of burner. The cap B, is a small, round piece of brass about $1\frac{1}{2}$ by $1\frac{1}{2}$ inches long, drilled as shown in Fig. 4, and screwed onto the piece F.

The oil tank used with this burner need not be of more than four or five gallons' capacity, having but one hose connection for the oil which flows by gravity, the tank being elevated ten feet or more for this purpose. The air is taken directly from the air line to the hose of the burner. Kerosene oil is used as fuel. This burner is used daily in our shops for brazing, removing old babbitt from brasses and for general straightening purposes.

It is extremely difficult to give a perfect idea of these tools by a written description, but the writer would be glad at any time to show them to any AMERICAN BLACKSMITH reader who could find it convenient to call upon him at the shops.

Our correspondent might have been more successful in his attempts if he had only attached the oil hose to his tank, as described above, and taken his air direct from the air line to the burner. He will also observe from a study of Fig. 2, that he reversed the courses of the air and oil. The air should pass through the straight passage and the oil through the crooked hole of burner. Some practice is generally necessary to handle these appliances perfectly, but when this is attained they will invariably be found invaluable.

Horseshoeing and the Care of Accounts.

J. W. SMITH.

Having had experience in shoeing in several States, I have had a chance to observe different ways and methods. I found that holding up a horse's front foot was very tiresome and hard on the knees, so I made two cushions, or pads, by taking canvas bags of small size and stuffing them with cotton. These I

fastened to straps, to fit and strap around my legs just above the knees. I find this relieves almost all the strain on the legs, as the foot rests on the cushions and there is no need to grip the animal's foot so tightly. We have all had experience with horses that jerk their feet and injure your legs with the nails. Since using the cushions I have not had a scratch.

When paring the hoof I use a draw knife, and in two or three cuts I have the foot leveled. I then pare the inside of the foot and quarters as much as is needed and with a few strokes of the rasp the foot is ready for the shoe.

My method of dealing with my customers is as follows: I have monthly statement blanks, which I fill out and hand to my customers as soon after the first of the month as I can (I send very few through the mail). These statements tell the debtor how much work has been done in the past month, and also the full amount of his bill. This method gives the debtor no chance to kick and say, "I didn't expect my account was so big." At the bottom these statements read: "Now is a good time to bring in your—, as such work is slack at this time and I can do it much cheaper than when I am crowded." The blank after "your" I fill in with the name of the work that is particularly slack and it rather makes a customer feel good to know that although I want my money, I also want more work from him.

Method of Treating Canker.

FRANZ WENKE.

My way of treating canker in a horse's foot is as follows: Clean out the foot with warm water and castile soap and cut away all ragged pieces; then poultice once or twice. Clean out foot again, cut all diseased parts out, except the sensitive tissue and put on a wide-sole shoe, fitted with a plate of sheet iron. The plate should be pushed in between the foot and the shoe or sprung in. Before putting on the plate, cover the diseased parts thickly with salicylic acid, covered with okum. Repeat this treatment if necessary. As soon as healthy granulation commences, dress the diseased parts with pine tar, mixed to a very thin paste with sulphuric acid. As soon as I dress the foot with the pine tar, I let the horse exercise at will in a dry place. Remember always to keep the horse's feet dry while treating for canker.

By letting the horse exercise during the healing process, you will stimulate the work of the living tissues and quicken the process of the healing.

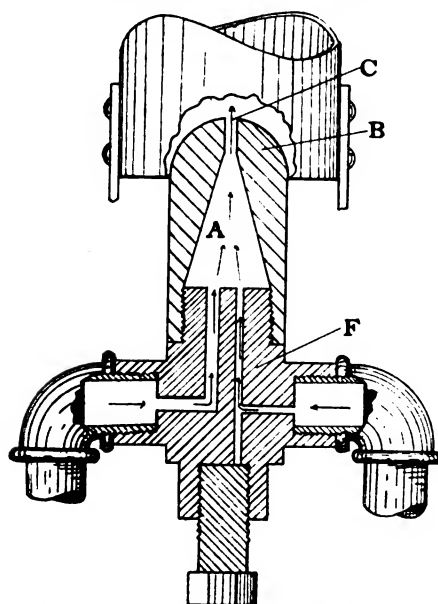


Fig. 4.—SHOWING SECTIONAL VIEW OF "T" PIECE OF OIL BURNER.

part F, Fig. 3, is shown in section on a larger scale in Fig. 4.

F is a small, solid double "T" piece of metal, into which a $\frac{1}{8}$ -inch hole and a $\frac{1}{4}$ -inch air hole are drilled, as shown. The air hole is drilled in the form of a

The Blacksmith's Alphabet.

BY SUBSCRIBER G. G. BENNETT.

A is for anvil, that great ugly thing,
B for the blacksmith making it ring.
C is the customer, without any tact,
D for the debt he's about to contract.

E is the echo that rings through the shop,
F is the fire that is blazing white hot.
G is the grinding we do at the drill,
H the hammer we use with such skill.

I is the iron we work every day,
J the journeyman, looking for pay.
K is the keen edge, our chisels do keep,
while
L is the labor that is always too cheap.

M is the money for Saturday night,
N is the nail that we drive in so tight.
O is the old man worn out at the trade,
P is the 'prentice, a jovial young blade.

Q is for quarreling, a thing we don't do,
R for the rollers our tires go through.
S stands for sledge, we handle with care,
T is for turning fine shoes for the fair.

U is the usage we get from the boss,
V stands for vise to file off the dross.
W for wages, which are always too cheap,
X being 'xpenses that ever are steep.

Y is the young smith who sports a fine watch.

Z is the zeal, not found in the botch,
& so on and so forth, as far as we go;
Put on more coal, boys, and don't be so slow.

CHORUS:

So merry, so merry, so merry are we,
No mortal on earth, more happy than me,
Hi dary! ho dary! hi dary dear,
A blacksmith is fond of his wife
and his beer.



Here's good luck for 1905.

Happy New Year to our readers.

Turn the proverbial new leaf, but keep it turned this time.

Rectify the mistakes of the old year in the conduct of the new.

Some smiths secure snug sums by skillful shoeing and speedy sharpening.

Every apprentice ought to receive all the encouragement possible. Lend a hand.

Procrastination pilfers profits, because time is money. How much did you lose in 1904 by "putting off?"

Hang up the calendar we sent you, and may its last leaf find you with a double store of this world's goods.

Never say die. Take fresh hold with no thought but of success. And drive your business,—don't let it drive you.

Your assistance is needed on that Lien Law. Send in your name to us today as in its favor and as willing to help get it.

A smile, a nod and a cheery word bring back rewards to you a hundred fold in popularity among your fellow men and

patrons. And by the way, one way to gain popularity is to show an interest in what interests the other fellow. Ask this one about his children, that one about his new barn, and so on.

A good blacksmith will find an opening at Banks, Washington County, Oregon. Mr. E. T. Turner of that place will give him any information desired.

The cheapest at the start may be the dearest in the end. The shrewd smith never allows low first cost to be the deciding factor in the purchase of a tool.

Our 1905 calendars—did you get a supply with your name on them to give your customers? Not too late yet to get and use some—there are a few left.

Increase your profits by taking up side lines. Windmills are good things to sell, and blacksmiths good men to sell them. Look up the windmill manufacturers and write for an agency.

In Indiana there is one smith we know of who prides himself upon the number and skill of apprentices that have received their training for the world's battle in his shop. "His boys," he terms them. This is a laudable feeling.

Pink Buffaloes are scurrying hither and thither around the country bearing messages from subscribers, saying "I read THE AMERICAN BLACKSMITH." Did you get a supply of these stamps? If not, drop us a line for a set of them.

Petrified. Is it not a fact that many blacksmiths get into such a rut that they prefer to drudge along at starvation prices, rather than make an effort to get their neighborhood shops together and put up the charges on work?

Don't hide your light under a bushel. If you have any skill in making new tools or getting up jigs for turning out duplicate work cheaply, let the boss or those in authority know it. You may in this way come to be boss yourself some day.

The keeping of books can often be simplified by a card system of accounts, each card showing date, nature and amount of the various charges against a customer, together with a record of payments. Each account when closed can have its card removed—no dead wood.

Strike out along some new line. Originality pays. The men with ideas are the ones who are reaping the greatest rewards today. But in striving for originality in your methods, your advertising or your printed matter, avoid cheap effects or any that will make you appear ludicrous.

Hundreds upon hundreds of items and articles have appeared in these columns during the past year, upon shoeing, forging, wagon making, repairing and all branches of smithshop work. A goodly array served to the taste of all readers. But have you thought to contribute an item or so to the feast yourself?

Money that's coming to you does you no good as long as some one else has it. Any smith can run his business better by collecting up close on outstanding accounts. For instance, it enables him to get the dealers' two per cent. Now's a good time to collect. Then, too, it gives you a bit of a surplus to pay up odd bills, such as the expired subscription to your favorite trade paper. Look up the back accounts now.

In the daily papers you don't read every article, do you? In the same way every word in this journal may not directly interest you, but in a year the number of items and the amount of information published here on your line of smith work, be it what it may, far exceeds what you could get for the same money invested in any other way. Isn't that so? THE AMERICAN BLACKSMITH claims that there is no smith who cannot get a great deal more than the cost from its columns each year.

Damaged goods. Be careful how you receipt for them. If goods shipped to you are damaged in transit and you receipt for them as "in good condition" the manufacturer or shipper cannot collect damages from the railroad company. When a case like this occurs, don't accept them from the railroad and then demand satisfaction from the shipper. The best way is to refuse them. Or you can sign for them, putting it in writing that they were received in bad condition. This kind of a receipt makes the railroad responsible for the damage.

Progressiveness in large railroad and industrial smith shops is displayed, more than in any other way, by the down-draft system of forge construction. The natural force causing smoke and heated gas to rise is very weak and inefficient under the best conditions. The down-draft system substitutes a far stronger force, generated by a power-driven exhaust fan, and all smoke and gases are sucked off into the adjustable hood immediately upon generation, with no chance of escape into the shop. The improved system does away with all overhead stacks and piping, at the same time that it affords better ventilation and lighting in the shop.

Do you remember the story last month about Tom Tardy and the money he lost by going hunting when he ought to have been collecting? Well, the best part of the story wasn't told. It has just come out. You see everyone is not as lax as Tom about collecting, so while our worthy friend was away enjoying himself, around comes his landlord looking for rent money, and finding the shop closed, he hurried to the house to see Mrs. Tom. That good woman has a better head for business than her husband, ten times over, and believes in collecting as well as paying bills promptly. Now, Tom had not bothered to say anything about the rent before he left for his trip, much less to see that money was provided to pay it. But the landlord's call set the good wife to thinking, so asking him to come later in the day, she hastened down to see the man who owed Tom the large bill and who was about to leave town. She told him she had to have the money to pay the landlord that very day. He tried to put her off, but Mrs. Tardy firmly though quietly refused to leave the house, till at the end of three hours the cash was produced just to get rid of her. The landlord paid and balance banked, Tom was allowed to bewail his hard luck for a week after his return before he was told the bill had been collected. And what thanks did the over-worked and under-estimated wife get? Tom's comment on hearing the good news was characteristic of him. "I wasn't worrying about the money, because I know'd perfectly well all the time that he'd pay up."

American Association of Blacksmiths and Horseshoers.**The Lien Law Movement.**

Briefly stated, the object of the State lien laws proposed by this association is to protect the labor expended by blacksmiths upon horses or vehicles, and to ensure payment for it, and for materials furnished. If a smith does work upon a horse or vehicle, or furnishes any material therefor, it is but a matter of simple justice that he be allowed to place a lien or claim upon such horse or vehicle to use it as security for payment. And he should be permitted to place a lien at any time within a year or two after the service giving rise to his claim. There are labor lien laws of many kinds upon the statute books of various States, yet there is no craftsman whose labor deserves more, but has less protection, than the blacksmith. Some of the craft are so fortunate, or so very conservative, that they do not lose a great deal. Others are so situated that they are obliged to give a considerable line of credit running for a year or more, because their farming customers have money but once a year, and in off years not as often as that. The inevitable consequence, when accounts grow stale in this way, is loss by bad debts, losses which the smith can ill afford to stand. The credit of blacksmiths can be and is abused far too much. What is urgently needed is protective legislation which will permit the creditor smith, by means of a lien, to use as security the horse or vehicle upon which he has put labor or material.

No just reasons can be urged against such laws. They are urgently needed, and would be a vast benefit. If the craft would have such legislation for its protection, it must agitate the cause, and come before the State Legislatures with a demand that its interests be cared for and protected.

The American Association of Blacksmiths and Horseshoers was organized for the purpose of advancing the interests of the craft in every possible way. It has been conducting a campaign of education and agitation for State lien laws. The time is now ripe for the introduction of lien law bills in many State Legislatures at their sessions now opening. We will gladly lead and direct the movement in every State where the craft shows its desire for such protection. We want every blacksmith and wagon-maker who reads this to sit down, if he is interested and would like such a law, and write us a postal, stating that he is in favor of one and will co-operate with us towards getting one. We will prompt-

ly advise him this can be done, and it will involve no expense on his part. Are you interested in securing a lien law in your State? If so, write at once, addressing your communication to Box 974, Buffalo, N. Y.

Better Prices For Smith Work.

Any smith who thinks the prices for work in his vicinity are too low to give a proper return for his skill and labor, can start a movement for better prices, with great advantage to himself. Our plans for forming local county associations and raising prices are cheerfully furnished to any of the craft, free of charge, and our aid will also be given freely towards getting such organizations under way. Are your prices too low? Send today for our plans, so as to get things under way as soon as the roads will permit meetings to be held.

The Blacksmiths and Wagon Makers' Association of Iowa.

The blacksmiths and wagon makers of Harrison County, Iowa, have made a record for quick organizing. They have united, elected officers, adopted by-laws and drawn up a schedule of prices within twenty days. This splendid performance should arouse all smiths, not already organized, to prompt action.

The following are extracts from the by-laws: For the first violation of the by-laws or constitution, a reprimand by the president; for the second offense, a fine of from \$1.00 to \$10.00 or suspension as the executive committee may decide; for the third offense, as the association may decide. Relating to the giving of credit, a rating shall be established in each town for the benefit of the association. The prices adopted shall be considered part of the by-laws, these prices to be the minimum. Any new shops starting in the county shall be reported to the president and the secretary, and reasonable inducements made to bring them into the association.

The price schedule adopted by the association is as follows:

Horse shoeing, new shoes, each...	\$0.50
Neverslip, span.....	5.00
Plugging shoes, per set.....	5.00
Hand made shoes, each.....	.75
Heel weights, per set of four....	4.00
Wagon tires, per set.....	2.00
Buggy and spring wagon tires....	3.00
Pointing cultivator shovels, per set	\$2.00 and up
Sharpening cultivator shovels...	.50
Plow lays, 14-inch.....	4.00
Land side plates.....	1.50
Pointing plow lays and polishing..	1.00
Sharpening grader lays.....	3.00
Ironing buggy poles.....	3.00
Ironing wagon poles.....	1.50
Setting tires that are cut down....	2.50
Blacksmith work, per hour.....	.50
Wagon tongues, new.....	2.50
Tongue and hound, complete.....	3.00
Circle hound.....	2.50

Buggy doubletree.....	\$.75
Buggy singletree.....	.50
Sawed fellows.....	.25
Half rim for buggy.....	.75
Bolsters	1.50
Cross bars.....	.75
One new shaft.....	1.25
Pair of shafts, complete.....	2.75
Hind hounds.....	2.00
Buggy reach.....	1.00
Plow beams.....	2.50
Wagon axles.....	3.00
Wagon skeins, per set.....	6.00

Method of Making Frames For Locomotives.*

We shall begin at the scrap pile, and have the scrap selected, piling it on boards, each pile to weigh about 250 pounds. Heat these piles properly and shingle them into slabs 9, 10 and 12 inches, according to size of frame. Cut them into three pieces and re-heat them at once, and shingle them into slabs for the frame back. You thus have a solid slab, and a reasonable assurance that the fibers are running the right way in the direction of the length, which is necessary to make the back as strong as possible.

Pile as many slabs as you require for the back, which should be made in one piece. We do not believe in it being made in two pieces and welded in the center, although we have heard some people advocate the making of frame backs in halves and welding them in the center. I quite understand their reason for doing so, as they are more easily handled, but for it being the best way, I do not believe in it; you might as well say make it in four pieces (which any reasonable person would say is absurd); they would be more easily handled and more could be turned out at the hammer, but I hold the more welds in the back the more liable it would be to break. In forging the back, care should be taken to have a good heat when the center is to be drawn out so that it can be done at one heat (as it is impossible to carry the weight out if you have to take a second heat). It must be understood that the pile has to be turned edgewise when taking down for the base.

The legs should be made of the same kind of slabs as the back (that is, re-piled scrap), only shorter, having enough in each pile to make one leg. The leg can be made long enough to weld the brace with a stump at the steam hammer. The braces are made out of scrap in a similar manner to the legs and backs according to the stock required.

We are now ready for welding on the legs, which should be done under a steam hammer, making a female scarf on the

* Report by M. J. Fenwick, read before the N. E. M. B. A. convention at Indianapolis.

leg and a male scarf on the back and driving them together. When welding them hot under a steam hammer, turn them sideways, using a thin tool on the side to weld in the scarf. After welding cut out the fillet to pattern with cutters under the hammer.

The braces should be welded with V pieces under the hammer. The front ends are done in a similar manner. We finish them at the forge, not letting them go to the fires.

Now, I think if this is followed, you will have as good a frame as it is possible to make, and also as cheap.

The Forging, Hardening and Tempering of Cold Chisels.

W. P. WOODSIDE.

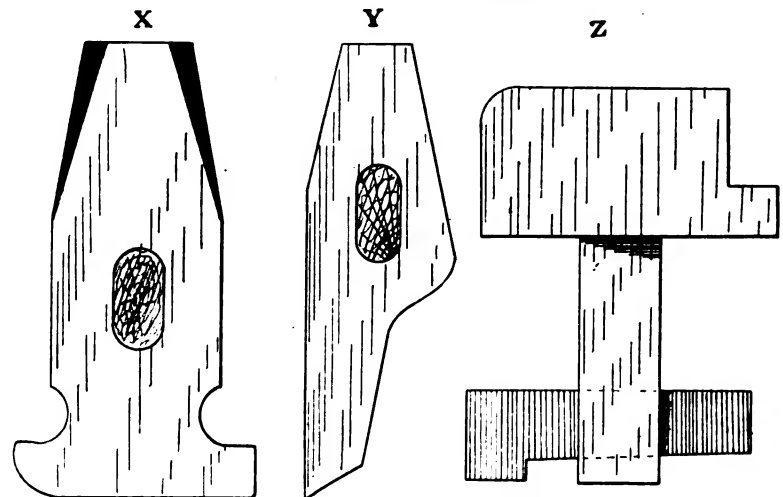
As the cold chisel is a much used and very much abused tool (both in the making and using) in a great many shops, I think a few remarks on the subject will not be out of place. I will endeavor to give my method of making good cold chisels.

First I cut off my pieces as follows: Flat chisels for machinists $6\frac{1}{2}$ inches to 7 inches of $\frac{3}{4}$ -inch octagon stock, or for boiler makers, $5\frac{1}{2}$ inches of $\frac{7}{8}$ -inch octagon stock. I then round up the heads, leaving the center of the head slightly raised. Having this done I proceed to draw them out, and in doing so, I use a fairly high heat (say a very bright red, but not a yellow). The idea is to have your steel to a nice easy forging heat so it will flow well under the hammer and not leave the piece full of drawing cracks, often called by a great many smiths, "water cracks," because they generally show up after hardening. I next take the piece to the hammer and draw it down to about twice the desired thickness and quite a bit narrower than desired when finished. I now put it back in the fire and heat it up a little, not nearly as hot as before, say a dark red, making sure to heat it evenly. I then start to thin it down and shape up ready to harden. In doing this I have my helper take a light hammer (say five or six pounds) and together we go all over the flat part of the chisel with quick, fairly heavy blows at first and gradually lighter as the piece cools. Do not hammer after the piece turns black, for if you do, you crush the grain of the steel, making it brittle and flakey like pie crust. Now hammer the chisel as evenly as possible, or if you wish, after you have hammered it down a little, put a flatter on it. Do not turn the chisel upon edge and hammer it, for if you do you undo the hammering you did on the flat side. Always try to regulate the first narrow-

ing of your chisels so that when they receive the last hammering on the flat side they will be the right width without any narrowing. After the hammering is done, I put the chisel back into the fire, and heat it to a very low even red, just enough so that I can see it is red, and see that it is heated evenly. I then put it into the annealing box to cool. This heating and slow cooling helps to relieve strains caused by forging, etc.

After the chisels are cool (I generally make two or three dozen at a time), I proceed to harden and temper them. I make up my fire with coke and lay a flat piece of iron on top of the fire, a piece that will cover about half the fire, upon which to lay the thin part of the chisel. When the heavier part takes heat, after showing red, I move the chisel back a little so the thin part or cutting edge will heat up. Now I heat my chisels to a nice even hardening heat

deep into the hardening bath, using salt and water for the bath, gradually moving the chisel up and down until well cooled, so that there is not enough heat left in it to draw the desired color. I next rough it bright with my rub stick (this is a piece of emery cloth wrapped around a stick). In doing this, I brighten it as evenly as possible, for if it is not brightened evenly the colors will be mixed and it will be difficult to tell the right shade. Rubbing one's fingers, when greasy or sweaty, over the brightened part has the same effect. I now hold it over the fire to help the tempering, using care that the thin part does not draw too quickly. I try to have my chisels show the same color for about two inches or more. I draw the color according to what the chisels are to cut and whatever the steel stands best at. Some I draw blue, some I leave straw color, but for ordinary work, a blue, with a slight purple stands well. But



HANDY TOOL FOR USE WHEN FORGING COLD CHISELS.

for about $2\frac{1}{2}$ or 3 inches. This heat I will not try to explain, but will say, to the lowest possible heat that the steel will harden at and show a severed grain. This, one can get a fairly good idea of by trying a piece at the heat you think it should have and then break it and notice the weight of the blow it takes and whether the grain is real fine or not. If it takes quite a blow to break it and the grain is very fine, it has the right heat and is also good stuff. But if it breaks very easily and the grain is coarse, it has been too hot. If it breaks easily and the grain is fine and dead looking it doesn't amount to much. Steel properly hardened should be very strong and of a fine grain with a silky lustre, resembling broken glass as to the grain. That is, if it is of good quality and has not been misused in the working.

When hardening, I plunge the chisels

as before stated, there is no standard rule. The steel and work a chisel is to be used on have to be taken into consideration. After I have my chisels to the color desired, I cool them off in warm water, as I find tools with a thin cutting edge stand better, if cooled from the tempering heat in warm water or allowed to cool of their own accord, providing there is not heat enough left in them to soften them too much. Now, brother smiths, you may say that this is quite a little bother for such a common thing as a cold chisel, but nevertheless I have found it pays to do as above, whether working for yourself or someone else.

Handy tools to be used in forging cold chisels are: X, a flatter with a round corner and slightly beveled face; Y, a side set to be used on sharp edge of block; Z, to trim chisels off square.

The block Z is beveled so that the chisel lies on it nearly flat, therefore making it very easy to forge a chisel flat for quite a distance back.

Dan Patch, Pacer, 1.56.

A Wonderful Horse.

It is an easy matter for one to sit down and think over the list of great performers that are in the lateral gaited class. The names of those that have performed creditably are legion and still when we come to simmer it all down, there is only one that can claim the title of having never been beaten, and

still holds every record. Supposing several years ago someone had ventured the opinion that a pacer would have a record as low as 1.56 drawing a sulky, and 1.57½ drawing a wagon, and 2.03 over a half-mile track? He would have been set down as a fit subject for a lunatic asylum; but that is just what has happened, and Dan Patch is the hero in every instance. It would be hard, indeed, to conceive of a grander stallion in every way than Dan Patch. He is a dark bay or brown horse, slightly under 16 hands high, is not the most

greatest pacer of any time and there is no horse in sight that even has a chance to beat his record.

We are indebted to *The Horse World* for the accompanying engraving and description of the grandest horse the world has ever seen.

Jacks for Holding and Lifting Pump Pipe.

LLEWELL R. SWARTZ.

The jack may be made of either 1½ inches by ½-inch steel, real good iron tire, or else out of 1½-inch square axle stubs taken from an old carriage axle.



DAN PATCH, THE FASTEST HORSE THE WORLD HAS EVER SEEN.

that one is Dan Patch, 1.56. He is as incomparably great and towers as much above any other pacer that has ever appeared, as do the present great passenger locomotives over the little engine that first drew a train from Albany to Schenectady. This may seem a strong statement, but the facts in the case bear it out. In the hands of a novice he raced like a veteran and in the hands of a professional he was the unbeaten. For two seasons he competed with the best in the land and always came off victorious. In his trials against Father Time he has proven himself to be the unconquerable hero, and at the close of the most eventful year in the history of the light harness horse, he held and

attractive gaited horse when going slowly, and it is only when he is aroused to his best efforts that he impresses one of his great speed and perfect way of going. He wears a five-ounce shoe all around. Forward he wears quarter, knee and arm boots and a light coronet boot behind. Notwithstanding the fact that he has gone to a record of 1.56, his owner, Mr. M. W. Savage, and also his trainer, H. L. Hersey, think him capable of far greater things. Improbable as this may seem, it is extremely likely that with all the conditions favorable, he will be capable of a mile in 1:55 or better in another year. Whether or not he is capable of reducing his record, the fact still remains that he is the

A shows the hook or claw which embraces the pipe. It is made for 1½-inch pump pipe, which is the size most commonly used. B is the lever and rest. E shows the jack complete resting on the platform holding the pipe as in use.

C is a side view of the hook to show the manner of forging so as to give it strength where the hole H is drilled or punched to receive a ½-inch or ¾-inch rivet. The lever, B, should be curved in the arm, so that when in use the hook cannot touch the platform to loosen the hold on the pipe. About three inches bend is right. A top view of B is shown at D. The hole, I, is intended to receive a chain or rope when using the tool over an old fashioned well or cistern,

so that the tool cannot fall in and be lost. The rivet should be good and strong, and fit like that in a pair of tongs. The tool opens and closes like a pair of tongs by lifting F away from G.

A tool for lifting and lowering pump pipes is shown at X. It is intended for

use 16 inches of $1\frac{1}{2}$ inch and taper from head to match the round. A set of these tools should consist of a jack, C, and A, rope, lift X, or a jack and two hand lifts, Y. I have handled a great many contrivances for handling pipe, and have found nothing that does the

than at the coronary band; the frog is pinched between the heels and is much shrunken. The hoof is dry and very hard, and is ridged toward the heels. Stumbling is common and the animals will usually start to walk stiff, when first taken out.

The treatment, of course, consists of preventative measures, such as keeping the feet moist, poulticing with linseed meal and boiled turnips, and applying greasy hoof ointments to the sole and walls of the foot. The wall of the foot must be spared from the abuse of the rasp, no calks should be used and the frog and heels must not be cut unnecessarily. The shoes should be reset at least once a month and daily exercise given the animal.

Many farriers endeavor to cure this disease by special shoes. This method is very well when supplemented by hoof packings, which will materially aid in curing the ailment. A shoe frequently used is one with beveled heels, made in such a manner as to force the heels apart and outward. In using this shoe, the nails should be kept well forward and away from the heels as much as practical. The hoof packing should consist of oakum, saturated with pine tar.

If the horse's services can be spared for two or three months, the following is recommended as being highly successful except in old, chronic cases, which are mostly incurable, although much relief may be effected by the method here detailed: The affected foot is shod with a tip (a shoe having its branches cut off at about the center of the foot). This tip is tapered from the toe to the end of the branches, which should end with a thin edge, and is fastened to the

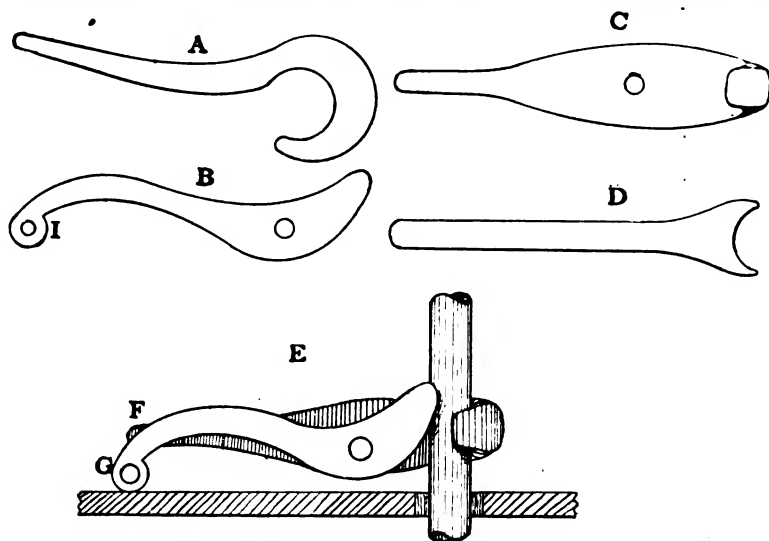


Fig. 1.—SHOWING PARTS OF PIPE-HOLDING JACK AND METHOD OF USING.

use with a rope, or by passing a bar or hand spike through the ring, so that two men can lift on it. A $1\frac{1}{2}$ -inch axle stub is the material to be used, and it should be of square stock. The opening should only be large enough to let the pipe into the hole of the tool, which should be $\frac{1}{2}$ inch larger than the pipe. Z shows the manner of using the tool. This tool may be made with less forging than the cuts indicate, but when so made it requires more careful handling than when made as shown.

Y is intended for hand use, and is used singly or in pairs. The ring at the end of the handle is for a hand-hold,

work better, or that can yank out a pump in less time. They are strong and always safe. I have a set that I have used for twelve years and they are as good as when made.

Diseases of the Foot—Causes, Symptoms and Treatment—5.

W. O. JULIUS.

Contracted Heels.

This is a disease very common to horses kept in stables with dry, hard floors. Saddle horses are also subject to the ailment. Most of the readers know the character of the disease, but it may be of benefit to say that it consists of a contraction or shrinkage of the tissues of the foot, thereby lessening the width of the heels. The front feet are the ones more often affected, although the hind feet may have it. Usually but one foot at a time is affected, and occasionally but one heel, and that the inner one, is contracted. The disease may or may not be accompanied by lameness.

The principal cause of the disease is changing from wet, marshy ground, to dry, hard stable floors. This causes a fever in the feet and a wasting away of the soft tissues. Another common cause is faulty shoeing (rasping the wall, cutting the frog and heels, using nails too near the heels and using high calks). The disease may also originate with some other disease of the foot.

The symptoms of the disease are, loss of the contour of the hoof; the ground surface of the foot is narrower

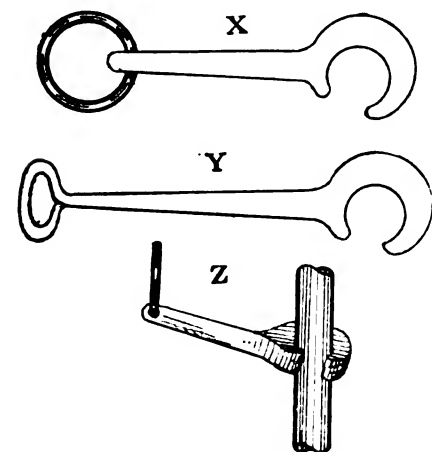


Fig. 2.—SHOWING PIPE-LIFTING JACK AND METHOD OF USING.

and is turned out of the handle solid, the same as a poker hand-hold. The light part should be $\frac{3}{4}$ or $\frac{1}{2}$ inch round, and the balance $1\frac{1}{2}$ square. A good plan is to

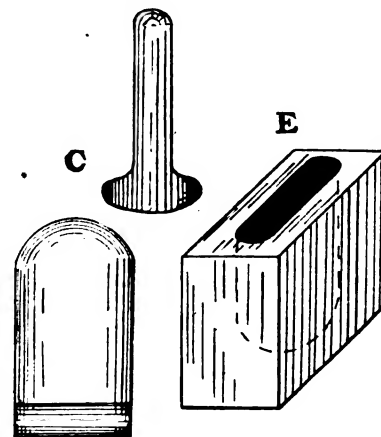


Fig. 1.—SHOWING VIEWS OF JUMP AND STAMP BLOCK.

toe with six or eight small nails, all of which should set well forward. Now, beginning at the heels, rasp away the horn of the wall until only a thin layer

protects the soft tissues. This rasping is to be done at the coronet and gradually lessened toward the bottom of the foot, where the hoof should be left its normal thickness. Now turn the horse into a damp field, and after two or

mark the center, as at H in the illustration. Now mark off half the distance there is between jumps, or $6\frac{1}{4}$ inches, and upset good, as at A, Fig. 2. Now drive the fuller well down into this upset portion and gradually shape it as

knock the block off and finish the edges and chamfer between Y and Z. Now put on the jump at Z, then at P, and the last one at X. If done in this way you will obtain the best results.

The next step is to bend the band at each jump as at F, so as to prevent their tearing when bending the band in a circle. Then measure off the circumference as shown by G and I, and add the thickness of the iron for welding. Then bend and weld.

Now to work out the eyes in the jumps, take a round punch, flattened at the point; this will swell out the iron when punching. Then with an eye-bolt fuller and swage, round the eyes. K and L, Fig. 3, show the plan of the finished band.

This method will make a solid job and a neat one. There are many ways of putting jumps on bands, but this way has proven the most successful. I have made many bands of this kind, but have never had a jump tear off or loosen while bending the band or punching the eyes.

Painting and Finishing Farm and Business Wagons.

M. C. HILLICK.

Various Processes Surface for Business Wagons—Using Elastic Varnish—Colors Which Please—Labor-Saving Appliances.

It is quite out of the question in a single paper to touch upon all the de-

three months' time the animal can usually be returned to work.

Of course, when any other disease is present, or when contractions of the heels have been caused by some other ailment, treatment will be useless until the cause is removed.

(To be continued.)

Making a Four-Eye Mast Band.

C. H. RICHARDSON.

Bands of this kind are used on all ships' yards and masts, as well as on derricks. To the eye, pointing toward the bow of the boat, is hung the boom or spar which lifts the weights. On the other three eyes are fastened wire stays to strengthen the mast. These four eyes pulling against one another cause a down and not a side pressure.

It is found desirable at all times to make a good, clean drawing of the band, so having the design before us we will now figure out the circumference of the ring. Having decided on the length, it is necessary to know the distance from center to center of the jumps. To get this, divide the circumference of the band by the number of eyes to be placed on it. In this case it is four.

My rule for figuring rings is as follows: The band we are to make is 16 inches in diameter, the iron to be used is 4 by $1\frac{1}{2}$ inches, so we say 16 plus $1\frac{1}{2}$, or $17\frac{1}{2}$, multiplied by $3\frac{1}{4}$, gives us 55 as the circumference of the band in inches. Now, we divide by 4 or the number of eyes in the band, and this gives us $13\frac{3}{4}$ inches for the distance from center to center of jumps.

Cut a bar of iron 60 inches long and

shown at B, by splitting with a hot chisel and fullering with a sharp fuller. Proceed with the others in the same manner, measuring for each from this first one.

Now, having the four jumps all ready as shown at C, Fig. 1, heat a jump and the portion of the bar it is to go into, to a good red heat; set the bar on its edge and drive the jump into place,

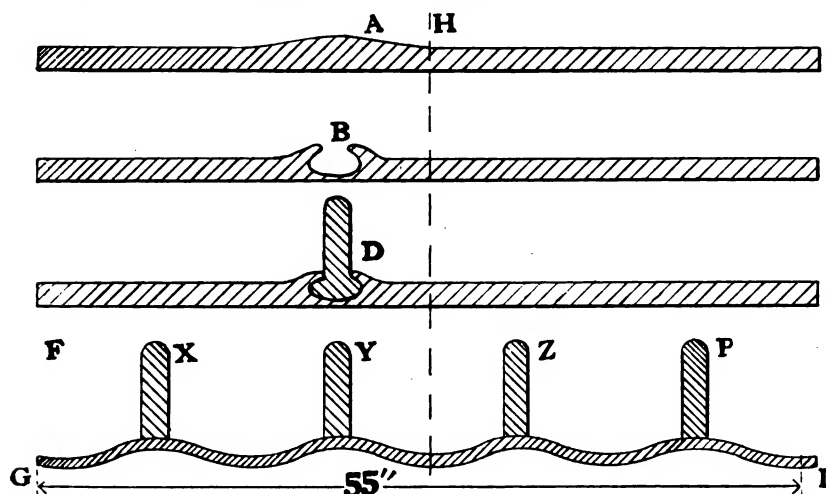


Fig. 2.—DETAIL OF METHOD USED IN PLACING JUMPS ON BAND.

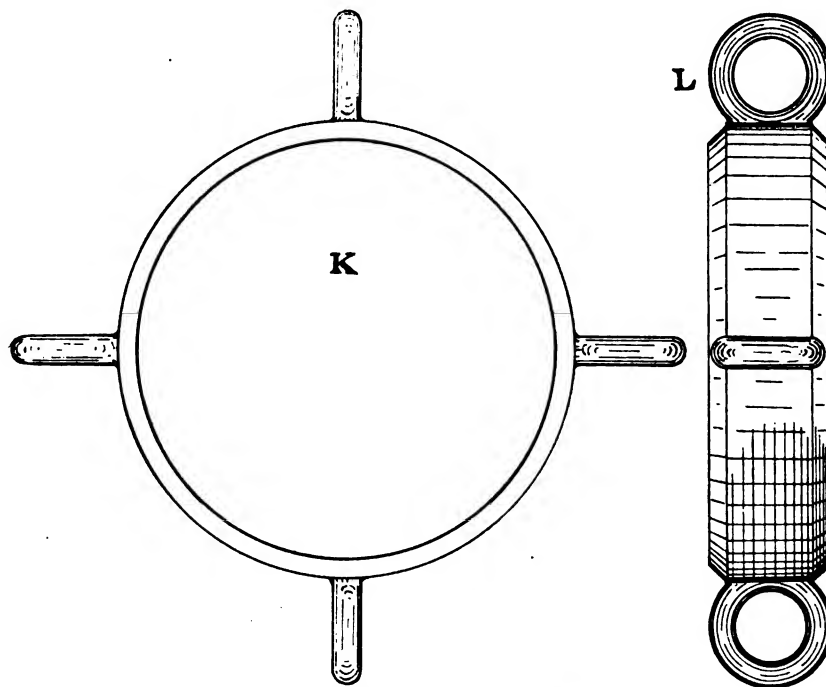


Fig. 3.—TOP AND SIDE VIEWS OF FINISHED MAST BAND.

hammering the scarfs down well, as at D. Now place in the fire, put a thin shell over it and heat slowly so as not to burn it. When hot, put in stamp block E, Fig. 1, and drive down well. Then

tails connected with the painting and finishing of farm wagons, trucks and the heavier types of business wagons, in view of which fact attention is invited to what may be considered the

more important essentials of the work.

In painting farm wagons and trucks from the new wood the item of chief importance is to get the wood saturated with a sufficiency of pure, raw linseed oil, carrying enough pigment to prevent the oil from striking too deeply into the wood. For this purpose perhaps there is no better combination of pigment than two parts of white lead ground in oil and one part of finely ground yellow ochre. Use just enough pigment to stain the oil and check its penetrative property.

For the second coat, take of the color chosen for the finish of the vehicle and use in the mixing $\frac{3}{4}$ oil to $\frac{1}{4}$ turpentine, with a gill of good coach japan added

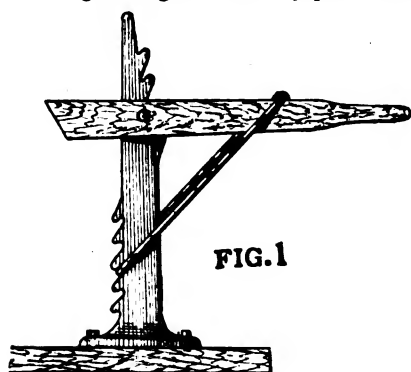


FIG. 1

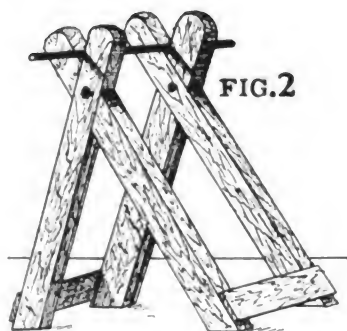


FIG. 2

Figs. 1 and 2.—A WHEEL JACK AND WHEEL HORSE FOR USE IN THE PAINT SHOP.

to $\frac{1}{2}$ gallon of the paint. On this coat when applied and dried out firm and strong, putty all necessary parts, using enough of the color in the putty to bring it out to the proper shade or tint. If the body of the wagon has any coarse-grained, open-textured wood, such places should be glazed over the priming coat with the ordinary carriage putty, cut to a glazing consistency with turpentine. Use a 2 $\frac{1}{2}$ -inch blade putty knife and make the putty thin enough to work readily from the knife. Press the glazing material firmly into the wood and remove the surplus material in order to reduce sand-papering to a minimum. Over the second coat of paint use the finish color, in the form of color-and-varnish for ordinary grade work. For a better grade use an additional coat of flat color and then the

color-and-varnish. Deadend this color-and-varnish coat, when dry, with a tuft of curled hair obtained from the trim shop, and stripe and finish.

Over old surfaces no painting should be done until all scaly, shelly paint has been sanded and scraped off, and a solid surface exposed. Then carefully proportion amount of oil for the first coat to the condition of the surface.

The Surface for Business Wagons.

The heavier type of business wagon, and the class that usually comes to the village or country painter, need not necessarily be coated up with rough stuff, unless the surfaces are unusually large. When not to be roughstuffed, prime as above advised, and glaze the surface carefully with glazing putty. Then when this has hardened sufficiently, sandpaper it very smooth, and coat up with color, sandpapering between coats to knock off all nibs and dirt atoms and to keep the surface smooth.

To use roughstuff for this work, apply over the primer a coat of roughstuff mixed with three parts lead and two parts filler, by weight, mixing it to a stiff paste with coach japan and rubbing varnish, equal parts and thinning to the proper consistency with turpentine. After 24 hours, sand paper smoothly and glaze with glazing putty. After another 24 hours, apply a coat of quick roughstuff, following nine hours later with a second coat of quick stuff. Then in due time, face down this surface with rubbing stone and water:

Using Elastic Varnish.

For the permanent good of truck, farm and business wagon painting, the paint surfaces of which are built up largely of elastic pigments, elastic varnishes, rather than the quick, hard drying ones, should be used. This, of course, is contrary to ordinary practice, but it is nevertheless founded upon experience. To coat elastic surfaces with hard, inelastic varnishes, is simply another way of sowing the wind to reap the whirlwind, and results in cracked and fissured surfaces. The elastic foundation carried through to the varnish stage should have an elastic varnish to protect it. This provides requisite harmony from the first to the final coat.

Colors Which Please.

The class of wagons here referred to are usually painted in bright, warm colors, yellows and reds being the chief favorites. Even the green box and the dull red gear of the farm wagon is bound

to give way to more inviting colors. The green and primitive red are ancient and honorable, but are also dreadfully commonplace.

Beautiful browns, warm and full of

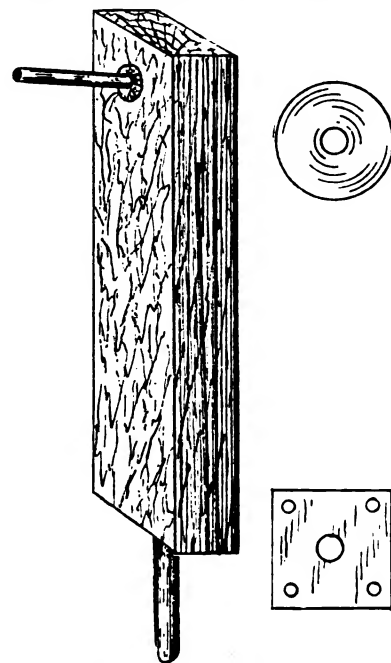


Fig. 3.—ANOTHER STYLE OF WHEEL HORSE.

tone and brilliancy, are now popular, and used to harmonize with the many fine shades of yellow, they yield rich and superb combinations. Olive and twentieth century browns, beside numerous browns made of Indian red, Prussian blue, chrome yellow, and lampblack, the shades being varied as the proportions of the various ingredients are varied.

The yellows used in harmony with the browns are light and medium shades of golden ochre, canary yellow, straw color, lemon chrome and twentieth century yellow. Wagons, while not ornately ornamented, are very plentifully striped, the lines being plain and finely drawn and placed with exact reference to developing the "smart" effects of the surface colors.

Labor-Saving Appliances.

In order to handle the truck and farm

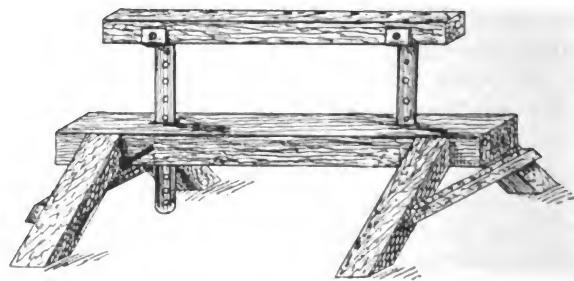


Fig. 4.—A STRONG AND VERY HANDY GEAR TREESTLE.

wagon equipment economically, it is necessary to have heavier and somewhat different labor-saving devices than are used in the ordinary line of carriage

painting. Fig. 1 illustrates a very simple, yet powerful wheel jack, to make, which requires but small labor and material. Fig. 2 is what in farm lingo is called a "saw-buck" wheel horse. The cut tells the story of its manufacture quite as clearly as any written description. Make the height to meet individual preference. Fig. 3 shows another wheel horse made of hard wood scantling $3\frac{1}{2}$ by 4 inches and 2 ft. 9 inches long. One end has a 6-inch round iron, $\frac{3}{4}$ or 1 inch in diameter. At the upper end set a $\frac{3}{8}$ -inch round iron at a slight angle to prevent the wheel from turning off. At a selected location in the shop bore a hole through the floor and into the joist to receive the 6-inch iron extension. Attach over this hole a 3-inch square plate with a $\frac{3}{4}$ -inch hole to hold the standard. Fasten a washer over the $\frac{3}{8}$ -inch wheel arm to carry the wheel free from the post, and the outfit will be complete.

Fig. 4 is a gear trestle strong enough to carry the heaviest wagon. The cut shows how it is made and worked, and for holding up heavy jobs it is invaluable. It is quickly and cheaply made.

An Arkansas Shop.

W. C. WARD.

I have a new shop 18 by 30 feet, situated at Baldknob, Arkansas, but am thinking of enlarging it and putting in a gas engine and some more good tools. The following will give you an idea of the prices we charge here:

Horseshoeing, plain	\$0.90
Horseshoeing, with toes.....	1.10
Filling road wagon wheel.....	3.00
Spoking wheel.....	2.00
Wagon axles.....	\$2.00 to 3.00
Setting road wagon tires, per tire..	.50
Setting log wagon tires, per tire.....	.75c to 1.00
Buggy tires, each.....	.50
Wagon skains.....	\$1.25 to 1.50
Bodies.....	\$3.00 up

Ornamental Iron Work.

The accompanying engraving is an example of some most artistic work executed by Mr. Thomas Googerty and the smithing classes under his direction.

It is a very fine piece of work, showing not only skill and careful workmanship, but much originality as well. The andirons with the twisted tops are par-

ticularly handsome, and with poker, shovel, tongs and stand to match, would prove a most pleasing adjunct to the most artistic drawing room.

Ornamental work in iron is becoming more and more conspicuous in our public buildings, churches and private homes. Many a craftsman starting at the work at this time may perhaps lay the foundation of a large business in this branch exclusively. There is certainly no limit to the uses to which this most instructive and artistic kind of smithing can be put, and the progressive smith who will take up this work in his spare time can reap considerable profit selling the result of his labor among his well-to-do customers. This branch of the craft has none of the disadvantages of some other branches, and



A PAIR OF ANDIRONS OF PARTICULARLY HANDSOME DESIGN.

presents a splendid field for the craftsman gifted in some degree with originality and carefulness of workmanship.

The Care of the Horse's Foot in Winter.

FRANZ WENKE.

If the horseshoers will pay attention they will find that most of the horses' hoof ailments start about spring. Why is this? We always hear authorities preach, and justly so, about hot fitting. But who ever reads or hears about the cold and frost being injurious to the horse's foot? It stands to reason that it does as much harm as heat, and this is considerable. We see a good many horseshoers, as well as horse-owners, paring the feet down until they yield to pressure with the thumb. This is bad practice at any time, but worst of all in the winter, when it is extremely cold. Without exception, I leave the sole

thicker and the wall correspondingly higher in winter than at any other time. In spring, after a thaw, and the animal's feet have lots of desquamation (scaling off), I clean the sole and frog of all old pieces, but do not cut it. Then I trim down the wall all it will bear to have a perfect foot. An observing horseshoer will find that the sole does not scale off in fall as much as it does in spring, at which time it falls out by itself. This is not due to the weather in spring, but nature intends it so. In fall the sole is solid, in spring it is scaly.

Remember that if a man drives a horse fast, the animal will sweat; so the man puts a blanket over his animal, so he should not catch cold. But nobody puts warm boots on a horse's feet, while the animal is standing in the cold snow or on the ice. Therefore, the horseshoer should not cut the feet down too close, especially the sole in winter. Rather shoe oftener, when the feet get too long.

Interfering With the Front Feet.

The Ankle Hitter.

E. W. FERRIN.

Ankle hitting is the commonest phase of interfering in front. It consists in the animal striking the inside of the fetlock, or ankle, with the inside of the shoe or hoof of the opposite foot, resulting in more or less injury to the fetlock, according to the severity of the case. In

some, the friction merely rubs off the hair, in others the blow struck is so severe as to cause considerable swelling and lameness and sometimes permanent injury to the joint. And it should be remembered that any enlargement of the joint greatly increases the difficulty, because the increased size of the joint increases the difficulty of the foot passing without striking the enlarged ankle.

There may be a combination of causes working together to produce interfering, but the predisposing cause is invariably defective conformation of the limbs. And as the toe-wide position shown in Fig. 1, is by far the commonest defect of the front legs, we will deal with that defect only in this article.

In the toe-wide horse the legs are not set square on the body; the whole limb may be twisted from the elbow down, or perhaps the cannon bone and pastern

only are affected. Sometimes one leg only is toe-wide, while its fellow sets square to the body. Of course there are many other defects in the conformation of the fore legs which cause interfering, but we can only deal with one in a short article, so we will stick to the toe-wide position, of which Fig. 1 (being drawn from life) is an excellent example.

The knee of the horse is a true hinge joint; hence, if the limbs are set on square to the body, the toe, when the knee is bent, will point to the hind leg on the same side, but if the fore legs are inclined outwards—*toe-wide*—then the toe of the front foot, when the knee bends, points to the hind leg on the opposite side; in other words, the feet of the true conformation move over a straight line, while the *toe-wide* horse describes a semi-circle to the inside. If you wish to demonstrate the mechanism of this proposition, take two pieces of wood about 18 inches long by four inches wide; hinge them together with a common strap hinge; take this and stand in front of a horse; hold your pieces of wood in front of one front leg and square to the horse's chest; now bend the hinge to imitate the movement of the knee and the end of the piece of wood will point to the horse's leg; now place your pieces of wood at a slight angle to the horse's chest, so as to represent the *toe-wide* position, and you will see the end of your piece of wood pointing across the body, so when you realize that the *toe-wide* horse raises his foot under and across the body, you will appreciate the mechanical impediment to clear going. Have a *toe-wide* horse trotted towards you, and his

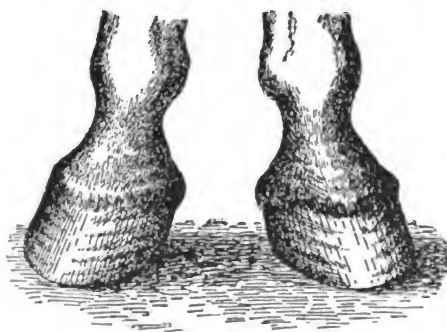


Fig. 1.—VIEW OF FRONT FEET, SHOWING TOE-WIDE POSITION.

characteristic action will surprise you. Moreover, when you observe how dangerously close they travel, even at their best, you will not be surprised that they interfere.

Horses of this conformation, in a natural state, wear the ground surface of their hoofs to a peculiar shape. If you

observe them closely you will find the inside somewhat straight with a long inside toe, while the outside toe and quarter will be rolled at the "breaking-over part," Fig. 2. This, then, is the proper way to prepare the hoofs for this conformation. Use a shoe like Fig. 3, fit full at inside toe, but close at A, B,

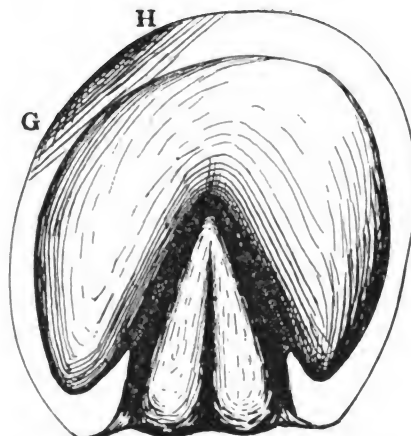


Fig. 2.—SHOWING BREAKING OVER POINT OF RIGHT FRONT FOOT.

—the point of contact—and roll the shoe at the outside toe and quarter, C, D. Horses of this conformation, even when in good condition, are likely to interfere; so that loss of condition, over-work, pain in the feet or legs from any cause, will readily make such horses interfere. Therefore, we see that a careful study of each case is necessary, for you cannot cure, by shoeing, a horse that interferes as a result of leg weariness or pain in a foot from a corn, or the development of a splint, etc. If your *toe-wide* horse is in condition, and free from pain in feet and legs, and still interferes, you may look to the shoeing for the cause. The most important part of the shoeing is the preparation of the hoofs. They must be pared to suit the conformation of the limb. Don't use more iron in the shoe than is necessary to a month's wear. Of course, other varieties of conformation will require various methods of treatment, but for the *toe-wide* horse, the application of these principles will prove effectual. Use a properly fitting boot to protect the part, until you are sure that your horse is going clear.

The Advantages of Gas Engine Power.

J. VESTAL.

I wish to give the advantages of power in shops. I have run a shop for thirteen years; eight years of that time I worked by hand and I know how to appreciate the help of power.

If a man is not able to put in more than one or two machines to start on, get a band saw and emery stand and wheels. With the band saw you can

rip lumber to a line, you can cut off and you can cut any curve, such as plow beams, wagon felloes, chair rockers, pulleys and in fact anything, even tenons and brackets. I have a rip circular saw, but you can run a shop without one. With the emery wheels you save files, coal, etc., besides doing saw gumming and a great many other jobs you would lose if you did not have it. I use a Fay and Egan wood worker, which is a buzz planer, jointer, rip and cut-off saw. I have a Hall and Brown, 36-inch band-saw machine, with three blades and I use it more than any other machine in the shop. I use a shaper or edge molder of my own make, with which I mould the edges of panels, raise panels, mould brackets, round wagon felloes and hounds, chamfer plow beams and wagon tongues, round up the edges of spring seats, foot boards, canopy-top frames, etc. I also have a rip-saw bench of my own make and a swing cut-off which I made, also. Of course, I buy the mandrels and saws and make the stands and frames. I have a wood lathe of 14-inch swing and I do a great deal of work on it.

One advantage of power is that the band saw will save enough timber in six months to pay for itself. I can cut out more plow beams and wagon felloes in one day than ten men can by hand, and when I have finished, it is done in a workman-like manner. I "get out" and dress wagon timber for four shops, because I have the power. I make all of the buggy and wagon seats and as it

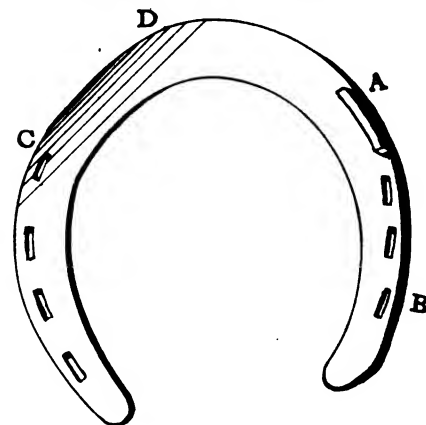


Fig. 3.—SHOWING STYLE OF SHOE FOR FOOT SHOWN IN FIG. 2.

looks like factory work, it builds up their trade as well as my own.

When you have power there is no use in doing nothing or sitting around watching for a job. Make something and sell it. I repair a great deal of broken furniture. I get out a great many brackets, columns and newel posts because I have power. I save all

the scraps that come out of curves at the band saw and make plow rounds, chair rounds, wagon box cleats, corner blocks and a number of other small articles which would have gone to chips if I had used the adze and hand axe.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

For welding poor iron or soft steel, many smiths recommend sand, glass sand or pulverized glass.

In starting the gas engine, if it fails to ignite its charge after three or four trials, it is folly to keep on turning in hopes of a start. Rather seek to find why the charge does not explode, and remedy it.

When steel warps on hardening, the experts tell us, it is an evidence of unequal heating, improper dipping in the hardening bath, or lack of annealing. Water is more apt to cause warping than oil or tallow.

It is common knowledge among shoers that ticklish horses must be handled boldly without any light touches. With many sensitive animals the only way to raise their feet is to seize them suddenly and firmly.

One of the chief troubles in hardening tool steel is to get a uniform heat. And in judging the heat, the careful workman bears in mind the variations in the shop lighting. For a given heat, the darker the shop the brighter will the iron appear.

Formerly toolsmiths were continually cautioned against overheating tool steel. Nowadays, with the high speed steels it's different. Many brands, in fact, fail unless forged at a high white heat. Successful toolsmiths learn to know their steel thoroughly and then stick to that brand.

Upon good authority the following recipe for carriage paint shop putty may be confidently recommended. Mix dry white lead with equal parts of japan and rubbing varnish. Avoid puttying in cracks or cavities where strains could come upon and loosen it, and never putty directly on the priming coat.

One of our Ohio friends, speaking about clips, says that on ordinary flat shoes, he makes them about as high as the shoe is thick, whereas on shoes with calks, toe and heel, he makes them a bit higher. He adds that of course they should be thicker and higher on the hind shoes than they are on the front ones.

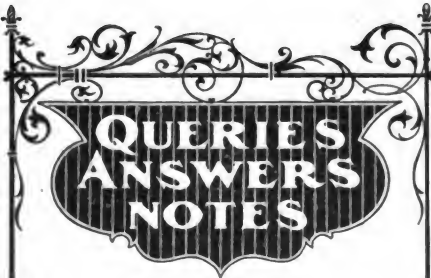
How many farriers, when a new horse is brought them, take the trouble to make a thorough examination? Intelligent shoeing is really impossible otherwise. The horse should be brought at a walk and a run both to and from the observer. The conformation, base-wide, base-narrow or normal, should be noted. The weight, height and length of the animal is not without its importance. Finally a minute examination of each limb, foot and hoof, as also the wear on the old shoes, should precede all careful shoeing.

A badly interfering horse came into the shop for shoeing last Monday. As he was very toe-wide behind, the boss shod him in

the following way. He used a shoe behind which had the inner half quite straight, omitting the nails and holes at the striking point and fitting it full and wide at the quarter. He then made the inner heel calk a little higher than the outer one, and fitted the outside half of the shoe as close and base-narrow as possible. The shoe was completed by drawing a clip at the middle of the outside half.

Try this plan the next time you have any steel to weld: Make a nice, long lap, scarfing the edges thin. To prevent slipping, it is a good idea to cut a crease across each lap with a chisel, one crease fitting the other. For the fire use plenty of charcoal or well-coked coal. Bring up your heat slowly, using some good steel welding compound liberally. When you have a good cherry red heat, shut off the blast and let the steel remain in the fire a few moments. Bring out, knock against anvil to remove dirt, place together and stick down with light blows. Follow with heavy blows, always striking so as to drive the weld together and never apart.

In welding steel, remember that its welding temperature is below that of iron, though higher, of course, than its own forging and hardening heats. In scarfing, be sure to get an ample welding surface, forking or nicking, if necessary, to prevent slipping under the hammer. The scale formed in scarfing should be removed by scraping or with a file. Heat in a clean fire to a red or yellow, bearing in mind that the harder the steel the lower is its welding temperature. Do not heat so hot that it sparks upon removing from the fire, for that is a sign of burning. The welding compound can be applied with a long-handled spoon without the risk run in removing the steel from the fire.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Query.—Can anyone give a good, cheap plan for making a power mortising machine? Who can help me? W. A. SHORT.

To Mend Saw Blades.—Would some brother smith tell me the method, or rather the name of the compound used for mending cracked and broken saw blades, and the best way to apply the compound and mend the broken blades? H. L. BLAISDELL.

Removing Rivets.—Answering Mr. M. Quinlan's query in the September paper, one way in which he could remove countersunk rivets is to center punch the heads, drill to the countersink and then punch them out in the usual way. O. BERN.

Point for a Solid Sweep.—Would some brother give me a description of a point for a solid sweep that can be bolted or riveted on, to stand three horses? The sweeps as now made in factories are not strong enough. They are used for plowing up cotton stalks and for bedding land. The size is 22 inches by 24 inches. GEO. W. DYCE.

Brazing and Welding.—Will some brother smith give a method for brazing? Also, is there anything better than borax for welding steel? J. L. WETZLER.

In Reply.—Brazing may be briefly explained as follows: The surfaces to be joined are thoroughly cleaned where they are to come in contact and are then held in position by wire or clamps. The joint is then heated, borax applied and a prepared brass called "spelter," sprinkled over the joint. The heating is continued until the spelter melts and flows into the joint, making a union between the pieces. Common brass wire, brass filings or small strips of brass may be used instead of the prepared spelter. Brass wire will be found very convenient in most cases, as it can be bent to the shape of the joint and held in place very easily.

Although borax is very good for welding, the following formula will probably be found superior: Dissolve together in water, eight pounds of borax, one pound of yellow prussiate of potash and one pound of sal ammoniac. When dissolved, evaporate them to dryness at a gentle heat, stirring the mixture constantly.

Tempering a Gun Spring.—Could someone tell me, through THE AMERICAN BLACKSMITH, how to temper a gun spring? I have tried it several times, but have never tempered them satisfactorily. Can some brother smith tell me? JOHN SHEPPARD.

In Reply.—One way to temper gun springs is to smear them with oil or tallow, after the springs have been hardened, and heat them until the grease begins to burn, allowing it to burn for a couple of minutes. A more reliable way to temper the springs is to put them into an iron trough and cover with cold oil or tallow, heating the whole gently. The temperature of the bath should be about 554 degrees Fahrenheit, to correspond to the blue tempering color. Care must be exercised in using this method as the oil will catch fire at a temperature not very much higher. A closely fitting lid should be provided for the trough, so as to safely remove the trough from the fire, should the oil start to burn. B. B.

Runaways.—**Buying Horses.**—I would like you to tell how to stop a runaway horse, as I think it would be of great interest to a blacksmith. He is generally on a roadway where such things happen. If he could stop it without harm to himself it would assist him in getting trade.

I would also like to know how to buy a horse, and to tell the age of one. A blacksmith is asked these things when a fresh horse comes to him, and it would be well for him to know. B. COOPER.

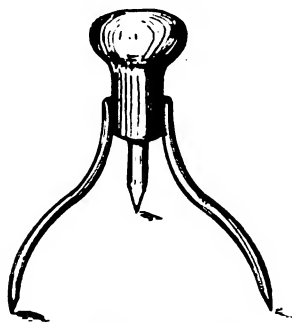
A Wagon Shop Query.—I run 50 truck wagons and would like to know what machinery I need to make my shop up to date, and its cost. What engine is best? Is gas or gasoline power best and cheapest? Is electric power cheaper or better than gas or gasoline? With this up-to-date machinery, how many men will it require to keep all these wagons in condition, providing they are started out in good shape? What should be the cost per wagon a year? What horsepower engine will be required? Can some brother answer? GEORGE K. WENIG.

Drilling Cast Iron.—How can chilled cast iron be softened so that it can be drilled easily? CARL LEICHTNER.

In Answer.—Heat the iron to a red heat, place a piece of brimstone on the iron where it is to be drilled and allow it to melt and be absorbed by the hot metal. If the iron is thick, put a piece of brimstone on each side at the place to be drilled. Now reheat the iron to a red heat and bury it in cinders

until it is cool. When cool you will find that you can drill very easily, if you have the proper drill.

Foot Rest for Clinching Shoes.—I have a foot rest which I use for clinching. Thinking it will perhaps benefit some brother, I give an explanation and diagram of the same. It is made of $\frac{3}{4}$ -inch round stock, with a one-inch rod, upset, for the head.



A HANDY FOOT REST.

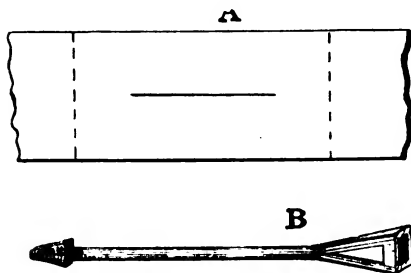
The legs are sharpened so as to stick into the floor and prevent the rest from slipping when in use.

W. FERGUSON.

Spoke Augers.—In reply to Mr. H. J. Suttles' inquiry regarding spoke augers, will say he does not say in what form he wants to use it. For a brace auger, I know of none as good as the Wood's auger, as it is perfect, clean cutting and easily adjusted, and is a very neat hand-power auger. I have a Dale machine equipped with the Star hollow auger, which gives the best of satisfaction. As to steam-power hollow augers, I have used one but with very poor results. I would not advise anyone to buy a spoke auger for power. Better to try it before buying.

M. A. FOSTER.

Making a Socket Wrench.—To make a handy socket wrench for a $\frac{1}{2}$ -inch nut, take a piece of buggy tire, $1\frac{1}{4}$ inches wide, and 12 inches long and cut a slit in the center,



MAKING A SOCKET WRENCH.

$1\frac{1}{4}$ inches long, as shown at A, in the engraving. Drive the square punch in the slit and allow the ends of the piece to lap back at the dotted lines and then weld them together. B shows a side view of the finished wrench.

R. D. PATTERSON.

Hardening Axle-Boxes.—In answer to "Enquirer's" question on hardening axle-boxes, I will say that on account of axle-boxes being so brittle when coming from the factory and as the first cost is small, it would not pay to bother with them. Also, the axle costs much more than the box and would wear much faster if the box were harder. However, I will give the following method for case-hardening the boxes: Heat the box to cherry red and put into it a mixture of borax, potash and bone dust, (more potash than of the other ingredients). Use this the same as borax and plunge the box into cold water while hot.

J. VESTAL.

Making a Steam Drill.—In answer to Mr. Thomas Long's question, how to make a steam drill, and a box for a truck-tongue, will say, it would be quite expensive to make one drill. To make patterns, to cast

a frame and to make shaftings, requires a lathe and key-seat machine. It would be cheaper to buy a new or second hand machine. I have a No. 2, L. Coes, bench drill and put on one loose and one tight pulley to run with my engine. It is fine for light work, for hand and power. I have had no experience in making iron truck-tongue boxes.

W. D. BOETTLER.

Pig Iron and Mild Steel.—In answer to Mr. McKay's inquiry regarding pig iron and mild steel, will say, I do not think it practical or economical to melt pig or soft iron to make steel castings, unless he has the special equipment and skill in that particular industry. He can purchase good steel castings at five cents a pound; they can be worked and welded almost as easily as machinery steel.

Semi-steel, which is a combination of cast iron and soft steel, is made to some extent in some foundries. The proportion of steel varies from 15 to 75 per cent. The greater the percentage of steel the more it assumes the characteristics of steel, but greater will be the difficulty of obtaining castings free from blow holes. This can be melted in crucible or cupola.

H. W. RUSHMER.

Tempering Cold Chisels.—Answering Mr. J. A. Dees' question on the best method of tempering cold chisels, the following is about the surest method: In forging the chisel to shape, the forged or cutting end should be slightly bulged (refer to the engraving). Crease or nick this across (B) with a hot chisel, but don't cut it off. Now heat the chisel for a little more than one-third the distance (C) from the cutting end, taking the heat slowly so as to heat the thicker part without overheating the point. When this part has been properly heated, harden to about D at the heated end in cold water. When the end is cooled, polish one side of the chisel so as to be able to watch for the temper. The part of the chisel between the upper edge D, of the cooled part, and the end C, of the heated part, will still be hot and will, of course, gradually re-heat the point. The polished surface will now change color, first yellow, then brown, and last purple. When the purple color reaches the crease or nick in the end, the whole chisel should be completely cooled. Now snap off the waste end and examine the grain. This will show whether the tool has been hardened at the proper temperature or not. If the grain is too coarse the chisel should be re-hardened at a lower temperature; if the metal is too soft it should be re-hardened at a higher temperature.

W. OTTO.

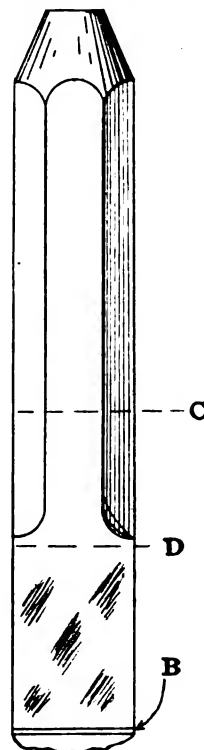
Welding a Step on a Nut.—In answer to J. C. S.'s query, will say that I have built spring wagons with the box projecting in such a manner as to make it necessary to climb over the wheel to get in, but I got wheels of the Madison Wheel Co., having a special point band designed for a step. It has a raised checkered ring around the end about $\frac{3}{4}$ of an inch wide, is nickel plated and makes a very handsome appearance. It might be possible to put a step on a cast nut if one has some brazing putty and feels competent to do a good job of brazing on cast iron. (Or a step might be welded to a block of wrought iron, then the block bored and tapped out and finished up for a nut, but either way would be too much trouble and expense. I should not expect a step on the nut to be satisfactory. It would not be a desirable thing sticking straight out from the end of the axle, and if bent up and back over the end of the hub and the nut should become loosened, it might throw down and injure someone.)

Painting a Wagon Cheaply.—In reply to Mr. Charles D. Briddell's query, in the September AMERICAN BLACKSMITH, the

secret of painting the wagon referred to, cheaply, depends not so much upon the formula as upon doing the work in sufficient quantity to specialize it, each particular process being entrusted to a workman who devotes his entire time to the one line.

To paint the body cheaply, but durably, note formula No. 1: Prime with raw linseed oil stained with two parts lead and one part yellow ochre. Putty with a quick, hard-drying carriage putty. Then glaze the surface with dry, white lead, shaded or tinted to match the desired body color. Mix equal parts of coach Japan and rubbing varnish and cut to glazing consistency with turpentine. Use a broad blade knife and press into the fibres of the wood, leaving no surplus to sand-paper off.

After forty-eight hours, sand-paper smoothly, and over-glaze any parts not sufficiently smoothed up. Apply two coats of the green or red pigment as



TEMPERING COLD CHISELS.

preferred, choosing strong, solid colors with unusual covering power. Stripe and ornament body in gold and black lines, and avoid ornate effects, applying the ornamental work directly upon the flat color. Apply one heavy coat of rubbing varnish and when dry, rub out with pulverized pumice stone and water, rubbing as close as the surface will permit. Clean up and finish with a heavy body-finishing varnish. Flow the varnish on instead of brushing it on and thus get the full mirror effect.

Formula No. 2: Prime body as in first formula. Then putty all cavities. After twenty-four hours, apply rough stuff made of equal parts, by weight, of American filler and keg white lead mixed to a stiff

consistency with equal parts of coach Japan and rubbing varnish, the mass then thinned with turpentine to a brushing consistency. Apply one coat per day, using at least three coats. After two days rub the surface with rubbing brick or block pumice stone and water. After rubbing, permit the surface to stand over night before coating. Then sand paper lightly with No. 00 paper, dust off and apply the desired color, using it in a condition to dry flat. Proceed as in formula No. 1, and apply in both cases the heaviest possible coats of varnish. In case vermilion is used as the red color, first apply a ground color, peach blow tint, made of Indian red and white. Then mix the vermilion in, rubbing varnish until it carries a gloss and apply it with a flat bristle brush. Deaden down with curled hair before striping. Stripe and finish in the usual way. Prime running parts, and then, with the hand, rub into the wood a coat of "rub lead," applied with a brush. Mix the rub lead as follows: Dry white lead ground through the paint mill in three-fourths raw linseed oil and one-fourth coach Japan. Give this coat forty-eight hours to dry, then sand-paper lightly and color, finishing the usual way.

M. C. HILICK.

SUPERIOR Horse Rasps

The Best Yet

Best High-grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim,
which gives the user the advantage of a long stroke,
— and at the same time a rasp of medium weight. —

Ask Your Dealer For Them



THE FOWLER NAIL COMPANY, SOLE MANUFACTURERS, SEYMOUR, CONNECTICUT.

Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Dec. 29, 1904, and are subject to change. Note the advance in prices since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

$\frac{1}{2}$ in. round or square; Iron, \$2.90; Steel, \$2.90
$\frac{3}{4}$ in. " " " 2.40 " 2.50
$\frac{1}{2}$ in. " " " 2.20 " 2.30

Flats—Bar and Band.

$\frac{1}{2}$ x 1 in.; Iron, \$2.90; Steel, \$2.90
$\frac{3}{4}$ x $1\frac{1}{2}$ in. " 2.20 " 2.20
$\frac{1}{2}$ x $1\frac{1}{2}$ in. " 2.40 " 2.40

Norway and Swedish Iron.

$\frac{1}{2}$ in. round or square, \$4.90
$\frac{3}{4}$ in. " " 4.50
$\frac{1}{2}$ in. " " 4.80
$\frac{3}{4}$ x 1 in. 4.80
$\frac{1}{2}$ x $1\frac{1}{2}$ in. 4.20

Horseshoe Iron.

For No. 1 shoe, $\frac{3}{8}$ x $\frac{1}{2}$ in. \$2.50
For No. 2 shoe, $\frac{1}{2}$ x $\frac{3}{4}$ in. 2.50
For No. 3 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in. 2.50
For No. 4 shoe, $\frac{3}{8}$ x $\frac{1}{2}$ in. 2.50

Toe Calk Steel.

$\frac{1}{2}$ x $\frac{3}{4}$ in. and larger, \$3.00
--

Spring Steel.

$\frac{1}{2}$ to $1\frac{1}{2}$ in. Rounds, Op. Hearth \$3.00, Crucible \$5.00
$1\frac{1}{2}$ to 6 in. by No. 4 gauge to $\frac{1}{2}$ in. Flats " 3.00, " 5.00

Carriage Bolts. (Net Price per Hundred).

$\frac{1}{2}$ x 2 in. \$0.54	$\frac{3}{8}$ x $2\frac{1}{2}$ in. \$0.82
$\frac{1}{2}$ x $2\frac{1}{2}$ in. .58	$\frac{3}{8}$ x $3\frac{1}{2}$ in. .96
$\frac{1}{2}$ x 3 in. .62	$\frac{3}{8}$ x 6 in. 1.81
$\frac{1}{2}$ x 8 in. .65	$\frac{3}{8}$ x 4 in. 1.70
$\frac{1}{2}$ x 2 in. .75	$\frac{3}{8}$ x 6 in. 2.10

PADDOCK-HAWLEY IRON CO.

Iron, Steel, Carriage and Heavy Hardware,
Trimings and Wood Material.

ST. LOUIS, MO.

CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

BLACKSMITHS be Master Mechanics for one dollar. Valuable samples free. Send today. W. M. TOY, Sidney, O.

SITUATION WANTED—Would like position of foreman in good shop where they do woodwork. Understand both iron and woodwork. Have run a business of my own for fifteen years. For particulars address, WM. SMALLEY, Holmes, Duchess Co., New York.

FOR SALE—Owing to poor health, will sell my blacksmith shop. Good trade, amounting to over \$1200 during past eleven months. For full particulars address, W. J. Sisson, Hastings, Iowa.

FOR SALE—Blacksmith shop, tools and dwelling. Good location. Write for particulars. AUGUSTUS WEGNER, Delton, Mich.

FOR SALE—Blacksmith shop and house, cheap. A chance for horseshoer and jobber. Reason for selling, sickness. For particulars address, A. B. TAYLOR, Box 42, Fowlerville, N. Y.

WANTED—A blacksmith who can do wagon woodwork. Write to GEO. C. SCHRECK, Pawpaw, Ill.

FOR SALE—On account of poor health, we will sell cheap our blacksmith, horseshoeing, wagon and carriage repair shop. For full particulars write to VELZY BROTHERS, Brant, N. Y.

FOR SALE—Blacksmith, wagon, buggy, paint and trimming shop, all complete. Two good dwelling houses with two acres of land and good fruit. Address CHARLES GABLE, Agent, New Freedom, Pa.

I CAN SELL YOUR BLACKSMITHING BUSINESS (with or without real estate) no matter where it is or what it is worth. Send description, state price, and learn my wonderfully successful plan. W. M. OSTRANDER, 109 North American Bldg., Philadelphia.

Trade, Literature and Notes.

AN INTERESTING PAMPHLET from the Folding Wagon-Box Company, at Haverhill, Ohio, points out the many advantages of the folding wagon box manufactured by that concern, and will be forwarded to any address without charge.

ADAMS EXPRESS CO., Hartford, Conn., writing to the Always Sharp Horseshoe Calk Co., Springfield, Mass., said: "Having used all the different kinds of calks, we find the 'Always Sharp' are the best. They last longer and after they are worn smooth they can be easily taken out and laid away as they make a most excellent mud calk."

IN COVER OF RED comes the catalogue of the International Power Vehicle Company, Stamford, Conn., makers of the International Kerosene Oil Engines. This catalogue is fully illustrated and deals with their engines from 14 to 10 horse-power in size. As the name implies, these engines are built to run with kerosene oil. Catalogue will be sent to any address upon request.

A WORK OF ART in itself is the 1905 catalogue of the Parry Manufacturing Company, of Indianapolis, Ind., just received. It is handsomely illustrated, perfectly printed and attractively bound, comprising a complete compendium of their various styles of surreys, phaetons, buggies, stanholes, driving wagons, road wagons, spring wagons and delivery wagons for the year 1905.

A NEAT LITTLE FOLDER of 16 pages has just been received from the Henricks Novelty Company, Indianapolis, Ind., illustrating and describing their Henricks Magneto, especially adapted for sparking high speed engines such as automobiles, launches, stationary and portable gas and gasoline engines. This circular also contains a large number of testimonials and will be sent free upon request.

JUST PUBLISHED is a new catalogue of the Bicknell Hardware Co., of Janesville, Wis., twenty-two pages and cover, envelope size. It is devoted to illustrating and describing the various types of punches, shears, bench and floor stand, emery grinders, manufactured by this firm, also their various types of jointers and their 1904 power hammer. This catalogue is a very neat one and will be sent free upon request to any address.

THOMPSON TUYERE IRON COMPANY, Indianapolis, Ind., inform us that they now have many thousands of their tuyere irons in use all over the country. Their claim for the Thompson Adjustable Extension Fire Tuyere Iron is that, while costing no more than any other good tuyere iron, it meets all possible demands for light and heavy work, being especially good for plow work horse-shoeing, tire setting and making long welds.

ON PAGE III, Cray Bros, Cleveland, are announcing an extension of their prize contest, open to all blacksmiths and wagon men who deal with them. Five prizes were originally offered, an automobile, a gas engine, \$50 in cash, \$25 and \$15. Five more prizes are now added, making ten in all: an anvil, a tire upsetter, a drill, a tire bolting machine, and a set of auger bits. For further details about this contest, write to Cray Bros, Cleveland.

THE INDUCTION COIL CO., Miller Bldg., Milwaukee, Wis., makes a specialty of ignition apparatus for explosive motors of all types. They make a coil which is said to be exceedingly efficient. One claim for it is that the vibrator will not stick, because the contact points are made of a platinum-iridium alloy—a very expensive composition, costing, weight for weight, more than gold. This coil is furnished for use with batteries or dynamo, as ordered, a dynamo coil requiring more current than one designed for use with batteries.

A NEW FACTORY, in addition to their present one has been contracted for by the Harvey Spring Co., of Racine Junction, Wis. The new building which is to be of brick, 45 by 150 feet, will be used for the fitting and tempering of their springs. They state that this extension of their factory has been made necessary by the large demand for their bolster springs, together with the fact that they have recently started manufacturing a complete line of platform, carriage and automobile springs. Their policy of reliable goods, coupled with courteous treatment of customers, has resulted in a considerable extension of business.

AN INTERESTING PAMPHLET comes to us

descriptive of the Standard Ball Axle, among the many special features of which are its perfect simplicity, with nothing to get out of order, combined with great strength. This axle is made by the Standard Ball Axle Works, of Lancaster, Pa., who claim for it that it runs easier under load, and costs less than any other axle which is half as good, and is also constructed so as to be oiled in a moment's time. These are only a few of the many advantages cited in the pamphlet, which will be sent free upon request to any interested.

THE COATES CLIPPER MFG. CO., of Worcester, Mass., are putting on the market this season a patented device for sharpening toe-calks. When an ice storm strikes the northern cities it is no unusual sight to see 50 to 75 horses waiting their turn to be sharpened. Time is money, and it is not a matter of expense to the horse owner, but it is a matter of time. With this device a horse can be sharpened in 8 to 10 minutes, meaning a big revenue to the blacksmith. This machine is run by a flexible shaft, and to the flexible shaft may be attached the horse clipper. It is endorsed by many blacksmiths and is shown on page LXVI. Anyone interested should send for this company's catalogue.

AT THE WORLD'S FAIR, St. Louis, among many exhibits of interest to the readers of THE AMERICAN BLACKSMITH, was that of the Weber Gas and Gasoline Engine Company, Kansas City, Mo., showing one of their new suction gas producers attached to a Weber 150 H.P. gas engine. The producer is essentially an apparatus for generating gas from ordinary coal for power purposes in conjunction with gas engines.

It consists of a cylindrical steel shell, which is lined with fire-brick and fitted with a grate, charging hopper and small hand blower, the blower being used for starting purposes only. A second cylindrical steel shell, known as the "scrubber," is used for cleaning and purifying the gas.

To operate the producer the furnace is first filled with charcoal, coke or anthracite coal, a fire is then started at the grate, and by means of the small blower an air blast is forced through the fuel, bringing it up to incandescence, when the use of the hand blower is discontinued, the engine accomplishing the continual operation or production of gas by the vacuum caused by the piston's taking in gas from a receiver between engine and scrubber.

Hydrogen, which is a necessary ingredient, is supplied by injecting a spray of water into the exhaust of the engine at the exhaust ports; the steam thus generated is piped back and drawn into the producer by suction, passing through the burning fuel and mixing with the gas as it forms. The

gas thus generated is conducted through a pipe to the bottom of the scrubber, where it passes through a water bath, then rises through the contents of the scrubber, consisting of coke, over which a spray of water is allowed to flow from the top. In this operation the gas is cleansed and the temperature reduced. The gas, now being thoroughly cleaned and cooled, flows into the receiver, from which it is piped to the engine.

The entire apparatus being air-tight, there is no possibility for it to generate gas except as may be called for by the engine itself and by the suction of the engine in actual operation. Therefore, no gas is stored and no gasometers, air blasts, valves or working parts are necessary.

By a patent feeding apparatus the producer is kept constantly charged with fuel without interfering with the gas production.

As there are no water pressure or steam gauges to watch, the attendance required is very light, one man being able to look after plants up to 1,000 horse-power.

The manufacturer claims that through the use of this producer it is possible to maintain one horse-power one hour on a fuel consumption of one pound, and besides fuel economy and attendance, there is economy in the quantity of water used and space occupied, the exhibit occupying a space six feet wide by 22 feet in length.

The plant complete, as installed at the Exposition with 75 K. W., direct-connected generator, has been sold to the C. E. Hertline Co., New York City.

TOPS

SLEIGH BASKETS, ETC.

"Send for our 1905 catalogue just out. It will interest you from a pocket-book standpoint."



BALTIMORE BUGGY TOP CO.
1001-03 Argyle Avenue, Baltimore, Md.

IMPORTANT NOTICE.

If the Blacksmiths who are intending to purchase a *Trip Hammer* will communicate with us, we will gladly mail them an illustrated Circular giving a description of our "*Little Sampson*" Hammer, and we will quote them a price that will insure us their order.

COLEMAN IRON WORKS CO., ELMIRA, N. Y., U.S.A.

DE CELLE'S HOOF TRIMMING NIPPERS



The best on the market, all steel, 14 inches long, knife $1\frac{1}{2}$ inches wide. Double leverage in handle. Knife is adjustable and detachable. Will pay for themselves in a week. Will ship a pair on receipt of price, \$3.50.

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First National Bank
Fort Collins National Bank

J. D. DeCELLE, Fort Collins, Colo.

A copy of our new catalogue and discount sheet will tell you all about

BOLSTER SPRINGS

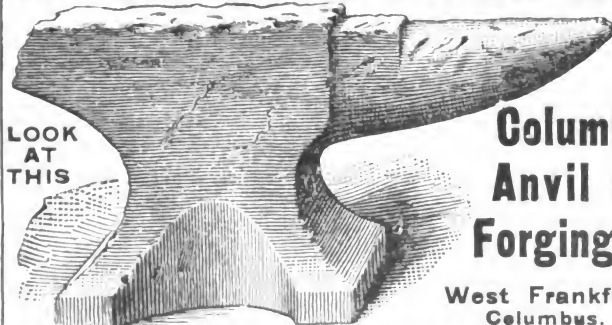
We also manufacture a complete line of

CARRIAGE AND AUTOMOBILE SPRINGS

WRITE FOR CATALOGUE

HARVEY SPRING CO., RACINE JUNCTION, WIS.

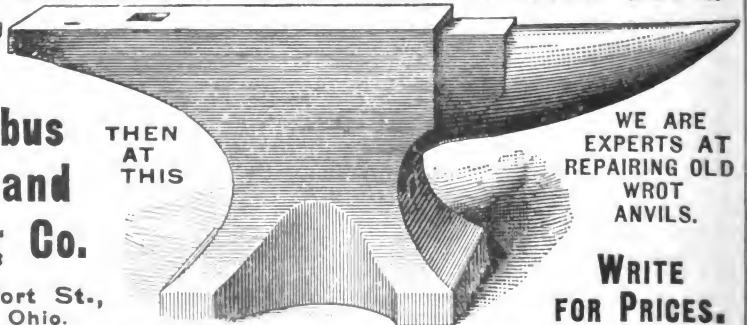
NO MATTER HOW BAD THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.



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Columbus
Anvil and
Forging Co.

West Frankfort St.,
Columbus, Ohio.



THEN
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WE ARE
EXPERTS AT
REPAIRING OLD
WROT
ANVILS.

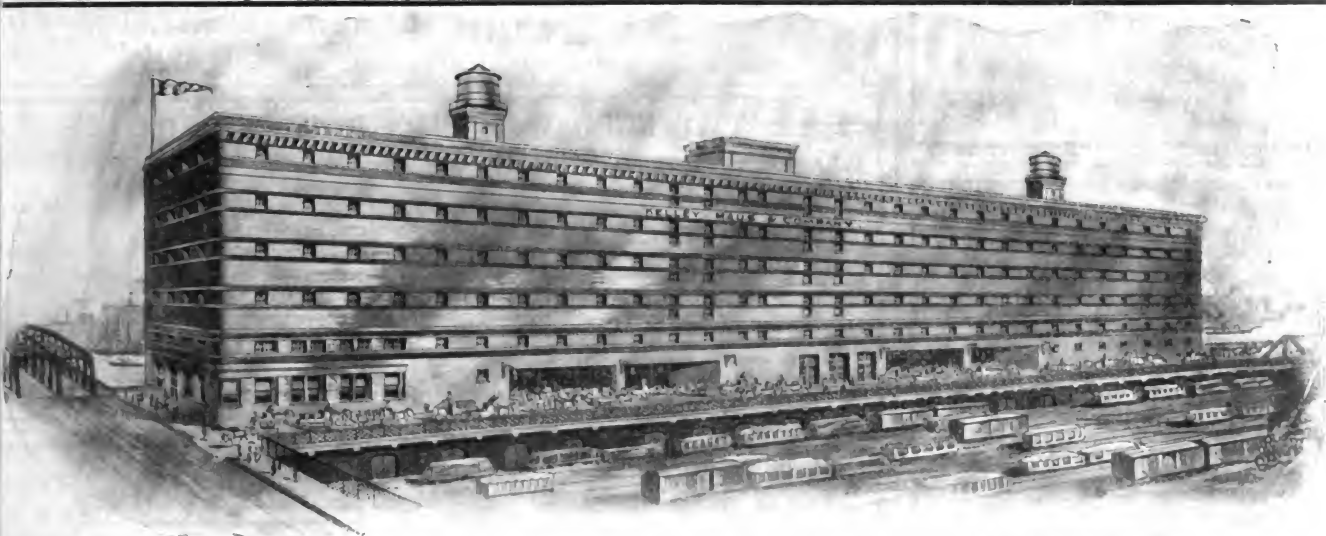
WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

ASK YOUR DEALER FOR THEM

THE PLACE TO BUY... BLACKSMITHS' OUTFITS

Wagon and Carriage Makers' Supplies, HEAVY HARDWARE IRON AND STEEL



LARGEST CONCERN IN THE WORLD DEVOTED EXCLUSIVELY TO THE ABOVE LINES.

KELLEY, MAUS & CO.,

Send for New '05 Catalogue.

Lake Street Bridge
Chicago.

A GOOD INVESTMENT

These long winter evenings are just the time for reading. The books listed below are written by well known authorities and are filled with good, practical, reliable information. Some, or all of them, ought to be in your library. Now is a good time to get them.

It is impossible to make a better investment. Good books on practical subjects written by the most able writers are what we have to offer, and we offer them at such reasonable prices that rather than say every smith can easily afford them, we claim that you cannot afford to be without them. Read over the list below, and judge for yourself.

The American Steel Worker

BY E. R. MARKHAM.

This work is the acknowledged authority on the subject of steel working. It is written in a plain understandable way, and treats on the hardening, tempering and annealing of steel. Over 150 illustrations, 340 pages. Handsomely bound in grey art cloth. Price \$2.50.

A Text-Book on Horseshoeing

BY A. LUNGWITZ.

A very complete work on the anatomy of the horse. Contains chapters on interfering, forging, diseases of the foot, how to shoe diseased and healthy feet, etc. Over 100 illustrations and 170 pages. Handsomely bound in blue and gold. Price \$2.00.

Forge Practice

BY JOHN L. BACON.

A most valuable treatise upon forge work of all kinds. It is profusely illustrated and con-

tains chapters on welding, upsetting, drawing out, bending, metallurgy and calculation of stock, also tables and formulas. This is the best book of the year. It has over 250 pages and is bound very neatly in red cloth. Price \$1.50.

Practical Carriage and Wagon Painting

BY M. C. HILLOCK.

A very complete treatise on the painting of vehicles, from a most delicate colored carriage to the rough and ready farm wagon. Recipes, formulas and mixtures. Full directions for every kind of vehicle painting. Fully illustrated and bound in red silk library cloth. Contains over 150 pages. Price \$1.00.

The Practical Gas Engineer

BY E. W. LONGANECKER, M. D.

A manual of practical gas and gasoline engine knowledge, covering errors to be avoided, and how to erect, run and care for an engine. It is

plainly written and tells you all about your engine. Contains over 140 pages and is neatly bound in green cloth. Price \$1.00.

Modern Blacksmithing

BY J. G. HOLMSTROM.

A well illustrated book on general blacksmithing work, shoeing, plow and tire work. Contains chapters on case hardening, babbiting, drilling and welding. Tells how to make butcher knives, hammers, chisels, plowshares, wrenches, etc. Contains over 200 pages and is handsomely bound in half-leather. Price \$1.00.

Foden's Mechanical Tables

Save all figuring, tell at a glance how much stock to use for oval or elliptical hoops of any size, the circumferences of circles, weight of flat, square and round stock, and the weight and strength of ropes and chains. Should be in every progressive smith's hands. Bound very neatly in green cloth. Price 50 cents.

ANY OF THESE BOOKS WILL BE SENT UPON RECEIPT OF PRICE, POSTAGE PREPAID. ADDRESS

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P. O. DRAWER 974 BUFFALO, N. Y.



Standard Taps at One-Half Price

A LEADING TOOL FACTORY that discontinued making Taps last year have just closed out to us their remnants, consisting of about 9000 First Class, Fully Warranted, Standard Taps. We bought them for less than they cost to make and offer while they last:

12 Machine Screw Taps, no two alike... \$0.75
(Assortment are put up. Can't change sizes.)
Any size Machine Screw Tap under No. 14..... \$0.10

Standard Machinists' Plug Taps



$\frac{1}{8}$ x 32, 36 or 40; $\frac{1}{4}$ x 24 or 32.....	\$0.11
$\frac{3}{8}$ x 20 or 24; $\frac{1}{2}$ x 20.....	.15
$\frac{5}{8}$ x 18 or 20; $\frac{3}{4}$ x 18 or 20.....	.17
$\frac{7}{8}$ x 16; $\frac{1}{2}$ x 18; $\frac{3}{4}$ x 16.....	.18
$\frac{1}{2}$ x 14; $\frac{3}{4}$ x 14.....	.20
$\frac{1}{2}$ x 12, 13 or 20; $\frac{3}{4}$ x 12 or 13; $\frac{1}{2}$ x 12, $\frac{3}{4}$ x 11.....	.25
$\frac{1}{2}$ x 11; $\frac{3}{4}$ x 11; $\frac{1}{2}$ x 10.....	.30
$\frac{1}{2}$ x 10; $\frac{3}{4}$ x 10; $\frac{1}{2}$ x 9.....	.40
$\frac{1}{2}$ x 8; $\frac{3}{4}$ x 8.....	.60
$\frac{1}{2}$ x 7; $\frac{3}{4}$ x 7.....	.75
$\frac{1}{2}$ x 6.....	.90
$\frac{1}{2}$ x 6.....	1.00
$\frac{1}{2}$ x 5.....	1.25
$\frac{1}{2}$ x 5.....	1.40
2 x 4.....	1.50

We have the following sizes in sets of 3—Taper, Plug and Bottom, at three times price of plug taps alone.

$\frac{1}{8}$ x 20	$\frac{1}{4}$ x 18	$\frac{3}{8}$ x 16	$\frac{1}{2}$ x 14
$\frac{1}{2}$ x 12	$\frac{3}{4}$ x 12	$\frac{1}{2}$ x 11	$\frac{3}{4}$ x 11
$\frac{1}{2}$ x 10	$\frac{3}{4}$ x 10	$\frac{1}{2}$ x 9	$\frac{3}{4}$ x 9
1 x 8	1 x 7	1 x 6	1 x 6
1 x 5	1 x 5	1 x 5	2 x 4

1 set each $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$, 15 Taps in Hardwood Case..... \$2.75
15 Bicycle Taper Taps $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{2}$ in Hardwood Case..... 2.75

16, 20, 24, 28 and 32 Thread. (Fine assortment for odd jobs.)

Full line of $\frac{1}{2}$ oversize Taper Taps to fit all Standard Screw Plates.

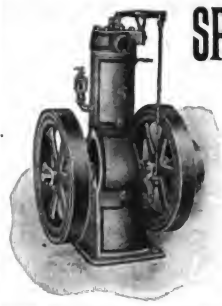
$\frac{1}{8}$, 16c.; $\frac{1}{4}$, 20c.; $\frac{3}{8}$, 22c.; $\frac{1}{2}$, 24c.; $\frac{3}{4}$, 28c.; $\frac{1}{2}$, 32c.; $\frac{3}{4}$, 36c.; $\frac{1}{2}$, 48c.; $\frac{3}{4}$, 64c.; 1, 75c.

In ordering state thread wanted and make of plate

All Taps smaller than $\frac{1}{2}$ in., mailed prepaid. Will prepay postage or express on all sizes, $\frac{1}{8}$ to $\frac{1}{2}$ in. for 10% extra. Larger than $\frac{1}{2}$ in., for 20% extra, or for all orders over \$10.00, will deliver anywhere in U. S. within 500 miles, for 50 cts., within 1000 miles for 75 cts., and over 1000 for \$1.00.

If you prefer, deposit price of goods with your bank or express agent, to be paid us on acceptance of goods by you and we will send goods subject to examination and approval.

Western Tool Co.
LANSING, MICH.



SPECIAL OFFER

3 H. P. gas or gasoline noiseless engines for the next thirty days in new section at \$150 complete, fully guaranteed, 18 different sizes. Highest award at every exposition shown. Thousands in use. Send for free catalogue. This ad appears but once. Mention THE AMERICAN BLACKSMITH.

A. A. LAZIER
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EUREKA SEPARATOR

Placed in Feed Pipe of Your Engine

TAKES the WATER out of GASOLENE.

SAVES HALF YOUR TROUBLES.
SIMPLE, CHEAP, EFFECTIVE.

EUREKA SEPARATOR CO.,
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TWO GOOD WORKS ON HORSESHOEING

A Text Book on Horseshoeing, by A. Lungwitz. A complete treatise on anatomy, shoeing, bad feet, interfering, etc. Cloth bound, 168 pages, 141 illustrations. \$2.00.
Magner's A B C Guide to sensible horseshoeing. Cloth bound, 130 pages, 400 illustrations. \$1.00.
Sent postpaid on receipt of price.

IT TELLS YOU HOW TO PAINT carriages, wagons and sleighs. Gives full directions for all kinds of work. Full of good receipts and useful hints.

PRACTICAL CARRIAGE AND WAGON PAINTING

A new enlarged edition of a standard book by M. C. Hillick, price postpaid \$1.00.

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.. The .. Tomlinson Anvil Punch

Punches Round or Square Holes

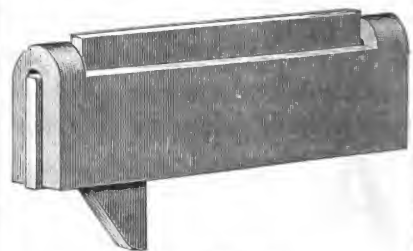
In iron or soft steel $\frac{1}{2}$ -inch thick, or $\frac{3}{4}$ -inch crucible steel. It is the most practical Punch in use and costs two-thirds less than any other punch. It's boss for plow and lister shares, blade steel and cultivator shovels. Every hole you need can be punched five times faster than drilling.

8 Dies and 8 Punches packed with Punches in each shipment.

SEND FOR CIRCULAR AND PRICE LIST.

Tomlinson Punch Co.,
SEVERY, KANSAS.

The Ideal Steel Center Toe Calk

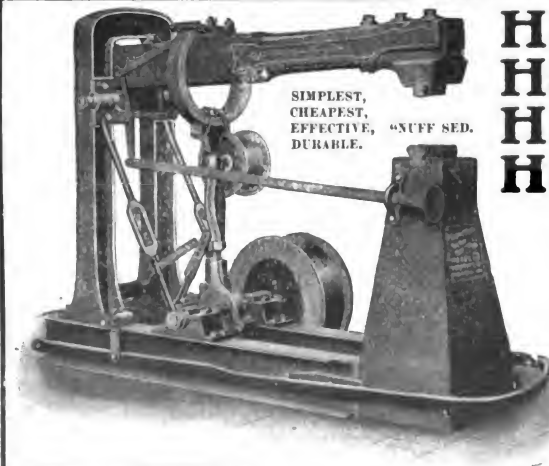


Patent Pending

The only successful Toe Calk with a steel center.

It welds easily and securely. The steel center will harden in water, while the outside remains soft. It is self-sharpening and durable. For winter or summer use it is the best. Try them.

The Weyburn Company,
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Hathorn's Hard-hitting Helve Hammer.

Ask your dealer or write to

**HATHORN
FOUNDRY &
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MASON CITY,
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A WONDER WORKER

NORTH STAR HARDENING COMPOUND WORKS LIKE A CHARM

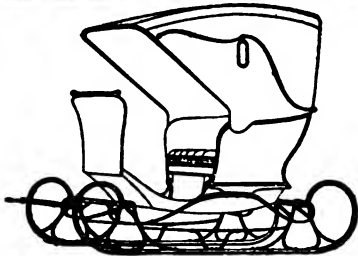
For steel, especially plow lays, it can't be beaten. Makes them hard and tough, but will neither warp nor crack them.

GUARANTEED TO ACT AS REPRESENTED.

\$3.50 Per Box. Enough for 48 gallons of water.

WRITE FOR PARTICULARS.

J. M. PRAZAK, EVANSVILLE, MINN.



The HOBBS PATENT RUNNER ATTACHMENT for every kind of a carriage from a Bike to a Hayes Hook and Ladder Truck

Are well known, but my Patent Double Ender Spring Sleigh is something new. It is the easiest riding sleigh ever made and practically two sleighs in one, for its top can be taken off or put on in a minute. The gear is preferable to bob sleds for a spring being more easily handled by the horse.

By substituting my single runners for its wheels, a road or bike makes the *lightest* and *best sleigh for speed ever devised*. These runners can be made to conform to a sleigh track on all pleasure carriages, their only attachment being the same as the wheel for which they are substituted.

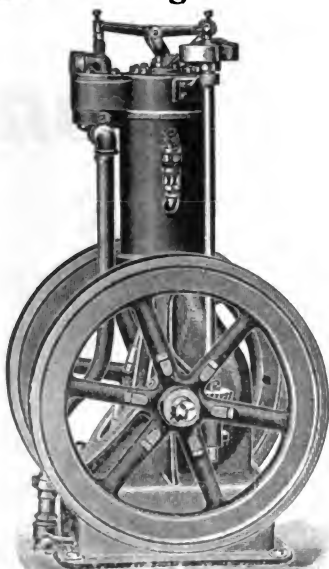
WANTED, BLACKSMITHS everywhere to solicit orders for these goods.

If interested cut this out and write to

John E. Hobbs, North Berwick, Me.

2 H.P. "Winnebago Chief" 3 H.P.

FULLY
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SIMPLEST
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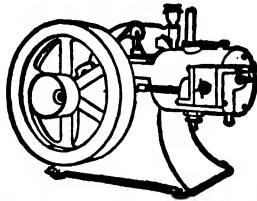
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Powers for Dog, Goat or Sheep
FOR RUNNING
Churns, Pumps, Corn Shellers, &c.
**WIND MILLS, TANKS, PUMPS,
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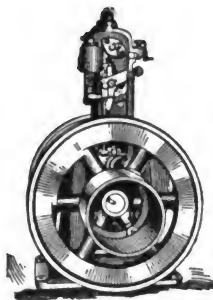
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batteries. Fully guaranteed.
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Runs by gas or gasoline; water-jacketed. ½ H. P. castings, not bored or faced, \$16.00. We also furnish castings for large sizes. Send for catalog of engines, dynamos, electrical supplies.

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Cincinnati, 1880.	Atlanta, 1895.	1901.
New York, 1881.	New York, 1896.	St. Louis (Louisiana Pur-
Louisville, 1883.	Nashville, 1896.	chase Exposition)
San Francisco, 1884.	New York, 1897.	1904.
New York, 1885.	Omaha, 1898.	

No engine could be uniformly successful without deserving it.

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For Central New York: - - A. T. Gibson, W. Winfield.

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Yours would be

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of handling a line of windmills declared by thousands of farmers to be the best on earth.

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WINNER | To Sell
Windmills Are Easy | To Erect
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"Winner" Windmill With Tank Tower Outfit

This is the Most Popular Style of independent water supply system used today, as by placing the tank inside

of the tower at sufficient height so that you may siphon water to the desired elevation in your house or buildings, and at the same time have a compact, neat and substantial outfit, suitable for supplying a necessary pressure to force water to any part of the house for domestic use and for emergency in fighting fire. It is of great convenience and in a measure indispensable to comfort and welfare.

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If you handle any other make don't sign up for 1905 until you have seen our latest "Agents' Contract and Prices," or,

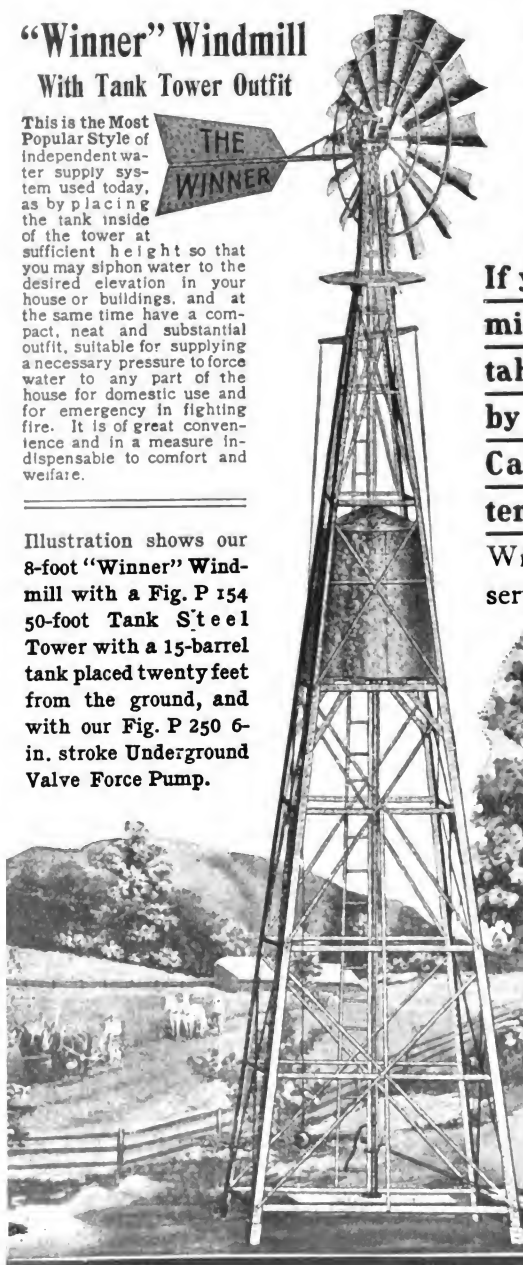
If you never handled Windmills, now is the time to take up this profitable line, by writing for our detailed Catalogue and favorable terms and prices to Agents.

Write today, as first come, first served. Address,

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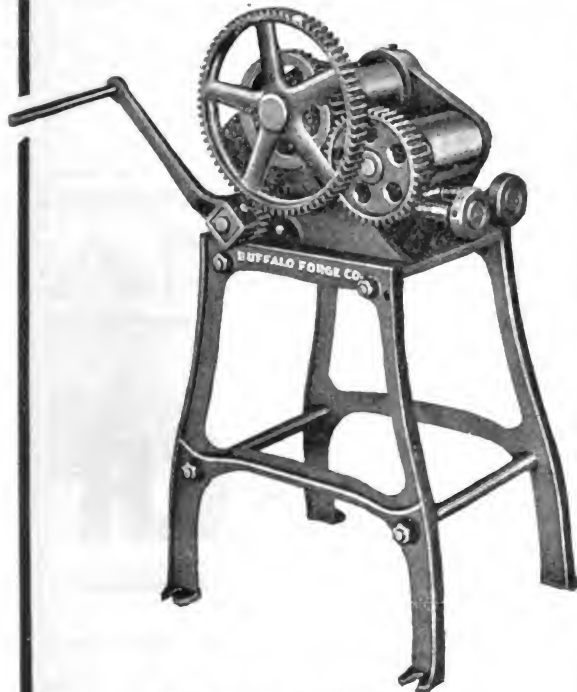
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Chicago, U. S. A.

We also make Windmill Regulators, Windmill Supplies, Pumps, Tanks, Pipe and Fittings, and Well Supplies. In fact—Everything for the "Windmill and Pump Man."



Buffalo Blacksmith Machinery

Tire Benders and Upsetters



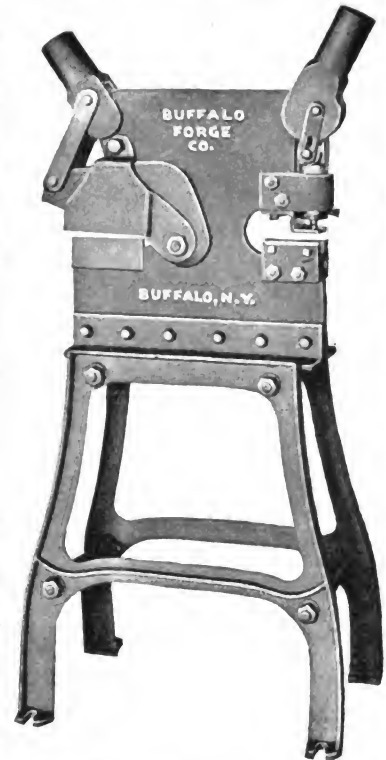
Buffalo No. 3 Tire Bender.

Buffalo No. 3 Tire Bender A Bender in a Class by Itself

You cannot find the equal of this machine in design, material or workmanship, and we guarantee you against cost for repairs due to wear. Compact, and of large capacity. Easy to operate. One man can bend $\frac{1}{2} \times 3$ " tire. It rolls well, and takes iron 5" wide. The radius of curvature can be quickly and easily changed. Furnished with a neat stand. Height, over all, 38"; weight, 230 lbs.

Buffalo Punch and Shear

It combines great strength, high power and light weight. The frame is made of a single piece of armor plate. The jaws, die blocks, links, and all other parts except stand are steel forgings. You can't break this frame. This size



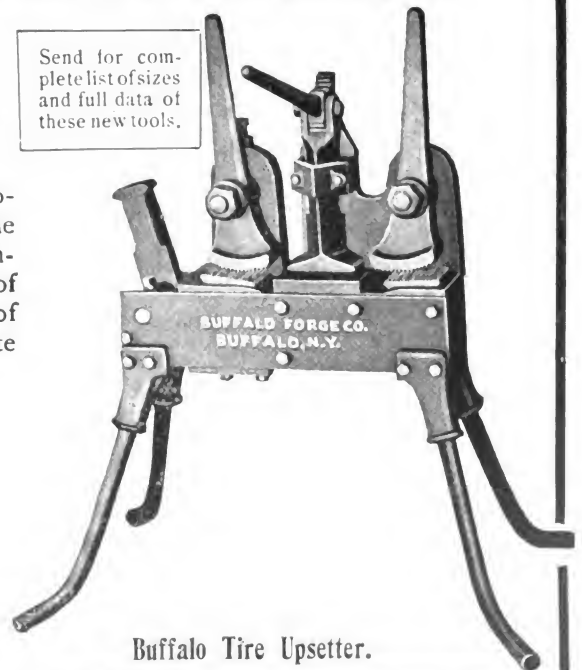
Buffalo Punch and Shear.

punches $\frac{3}{8}$ " holes and to the center of $8\frac{1}{2}$ " circle. It shears bars up to $\frac{3}{8} \times 2\frac{1}{2}$ " in size, jaws opening to $4\frac{1}{2}$ ". Weight, with stand, 155 lbs.; height, 39". Furnished with stand, as shown in the cut. Up-to-date in every detail. No repair shop complete without this new Buffalo Punch and Shear. You could not make a better investment. Will save time and increase profits. We guarantee to replace free any frame breaking in 5 years. When you buy through a dealer make him furnish this written guarantee of the maker, then you will get the genuine goods.

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A modern tool; indispensable to a modern shop. Simple in design. Substantial in construction. A machine of high power, absolutely non-kinking and non-buckling. Made especially to upset either flat or curve stock. The lower grips automatically adjust themselves to any curve. With size shown, one man can upset $3 \times \frac{5}{8}$ " tires with a single stroke of lever. Constructed of the best armor plate, with grips of steel and legs of wrought iron with floor holes. Height of grips, 22"; length of body, 22"; weight, 267 lbs. You can't break the armor plate frame of this machine.

Send for complete list of sizes and full data of these new tools.



Buffalo Tire Upsetter.

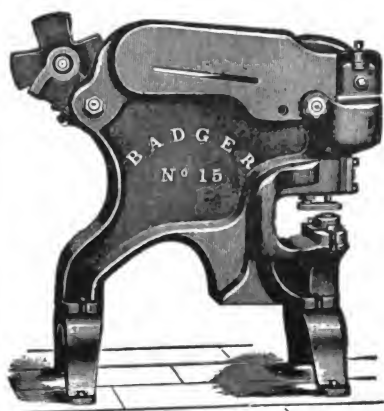
**Buffalo Forge
Company,**

Buffalo, N. Y., U. S. A.

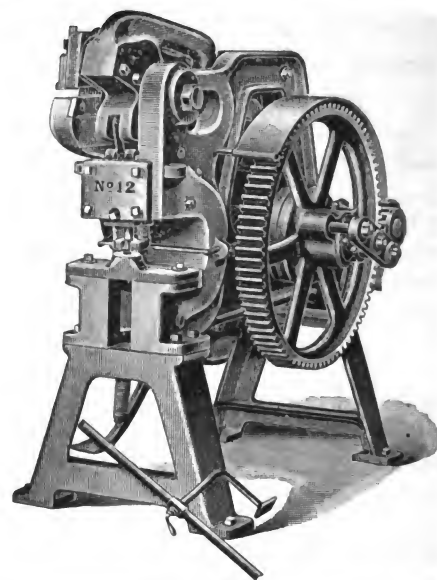
1905

Punches and Shears

— A LINE —
COMPLETE
FOR EVERY PURPOSE
BOTH
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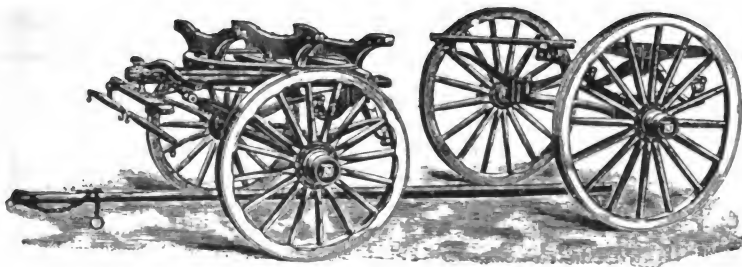
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TRENTON***"It rings like a bell".*Manufactured by **THE COLUMBUS FORGE & IRON CO.,** Columbus, O.Sole Sale Agent **HERMANN BOKER & COMPANY,**
101 Duane Street, New York City.**AN AXLE***Which is coming into favor
again is here illustrated, the***Stivers —
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We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

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Write to the***DALZELL AXLE CO.,**

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AND
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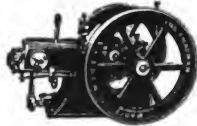
ECLIPSE GAS AND GASOLINE ENGINES.

Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.
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Catalogue on request.

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SPECIAL COMBINATION PRICE

on 20-inch Band Saw
and 1½-horsepower
Gasoline Engine to
drive it. Write now to



CHAPMAN ENGINE WORKS, Marcellus, Mich.

EVERY MAN WHO SHOES HORSES

Will want a copy of my
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ARTISTIC HORSE-SHOEING

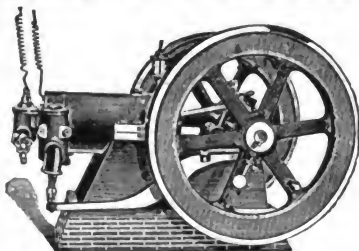
It is a practical, scientific treatise, giving improved methods of shoeing. Special directions given for correcting faulty action in trotters, and for shaping shoes to cure different foot diseases.

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No more broken
points of hubs

No more axle ends
or axle nuts
exposed

No grease on the
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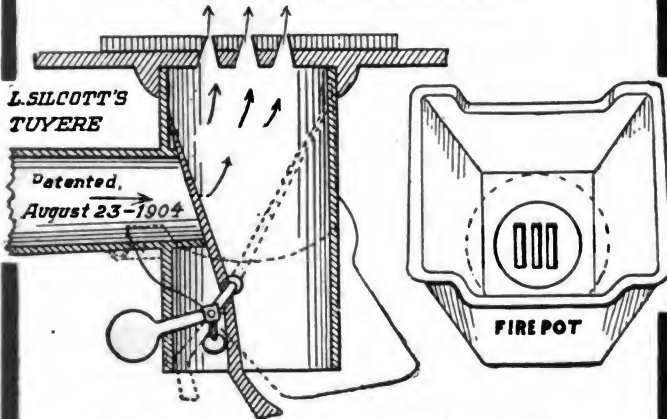
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ALL SIZES AND KINDS OF
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for the
WHOLESALE TRADE ONLY

Write us for prices and name
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Every Blacksmith WHO HAS USED Silcott's Patent Tuyere

Says it is the BEST ever made.



Some of the Reasons why Silcott's Patent Tuyere is the BEST:
It is—Air cooled, self cleaning, simple, reliable and a dandy.
It will—Save coal, hold fire for six hours and last a life-time.
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It keeps—The fire from spreading; gas out of the bellows and pipe.

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for Bent Shapes.

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Simple
Forged Work.

Calculation of
Stock; and
Making of
General Forgings.

Steam-hammer
Work.

Duplicate Work.

Metallurgy of
Iron and Steel.

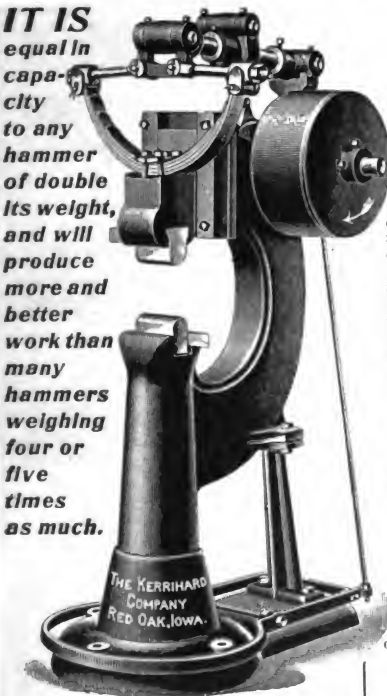
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and Tempering.

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Work.

Tables. Index.

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capa-
city
to any
hammer
of double
its weight,
and will
produce
more and
better
work than
many
hammers
weighing
four or
five
times
as much.



Height over all - - 55 inches
Floor space - - 18x30 inches
Height to top of anvil block, 31 inches
Weight - - 700 pounds

If You Want a Good Hammer

One that will do your work, do it well, and do it quickly, get

KERRIHARD'S Power Hammer

We use every care in its manufacture. A perfect system of jigs and templates insures all parts being interchangeable and enables us to produce a high grade machine at a price much lower than that asked by other makers.

The material is the very best; the design and construction is suited to withstand the strains of actual practice. We have combined the well-known principles of the helve and direct-acting hammers in such a way as to eliminate the objectionable features of each and secure the advantages of both.

The main frame casting is in one piece with anvil, with the metal in the proper place to withstand the jar

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The friction clutch is new and is the best clutch for the purpose yet produced. It has but three parts, and is therefore not liable to get out of order. It controls the hammer to perfection by foot pressure.

OUR 1905

Emery Grinder

Will carry wheels 20 inches in diameter and 3 inches thick or smaller, with a 1¼ hole.

Especially Designed for the Blacksmith Trade.

This machine is built to meet the demand of a comparatively cheap but handy floor grinder.

The rests are made to stand heavy work and can be arranged to the side or face of the wheel. Extra long bearings reduce friction to a minimum, preventing wear and springing of the arbor and insuring steady, true running.



We send with
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neat wrench for
removing the
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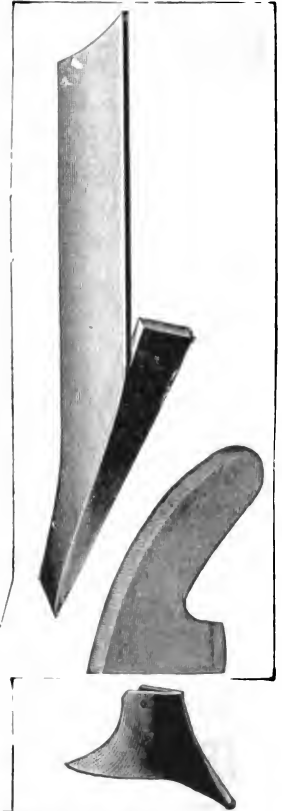


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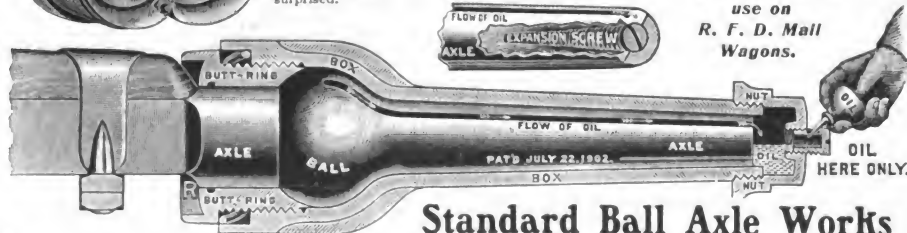
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BALL-BEARING AXLE

Sold strictly on its merits, fully guaranteed, and at the cost of a common axle.

Write us at once
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surprised.

See that Extension Screw.

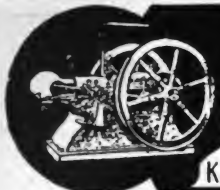
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Catalogue M.

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1 1/2 in. x 1 1/2 in. 1.00	5 in. x 2 in. 2.30
1 1/2 in. x 1 1/2 in. 1.10	4 in. x 2 1/2 in. 2.45
1 1/2 in. x 2 in. 1.25	5 in. x 2 1/2 in. 2.75
1 1/2 in. x 2 1/2 in. 1.25	
1 1/2 in. x 2 1/2 in. 1.30	We use best grades
1 1/2 in. x 3 in. 1.50	of Oak and
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ONLY HIGH-GRADE WORK DONE.

(A Lady can hold him.)

THE BEERY BIT

FOUR BITS IN ONE



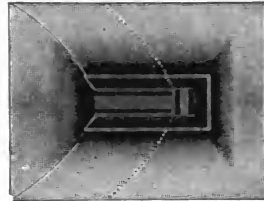
Cures Kickers, Shyers, Bolters, Pullers and Runaways.

There are four distinct ways of using it. They sell at sight. Agents make big money selling them. One agent writes: "I am leaving the farm to devote my entire time to the sale of the bit." Send postal for terms to agents.

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A great many Blacksmiths are selling the bits just by showing them to their regular customers at their shops.

\$500 SPECIAL PRICE



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Made Complete with Brass Eyelets and Leather Strings.

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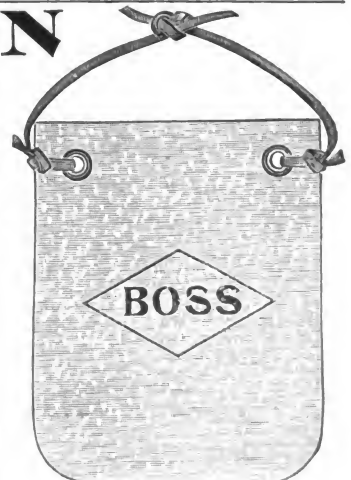
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The only gas engine on earth that is double headed and takes gas at both ends.

Just like a steam engine
Impulse at every stroke.
Steady as a clock.

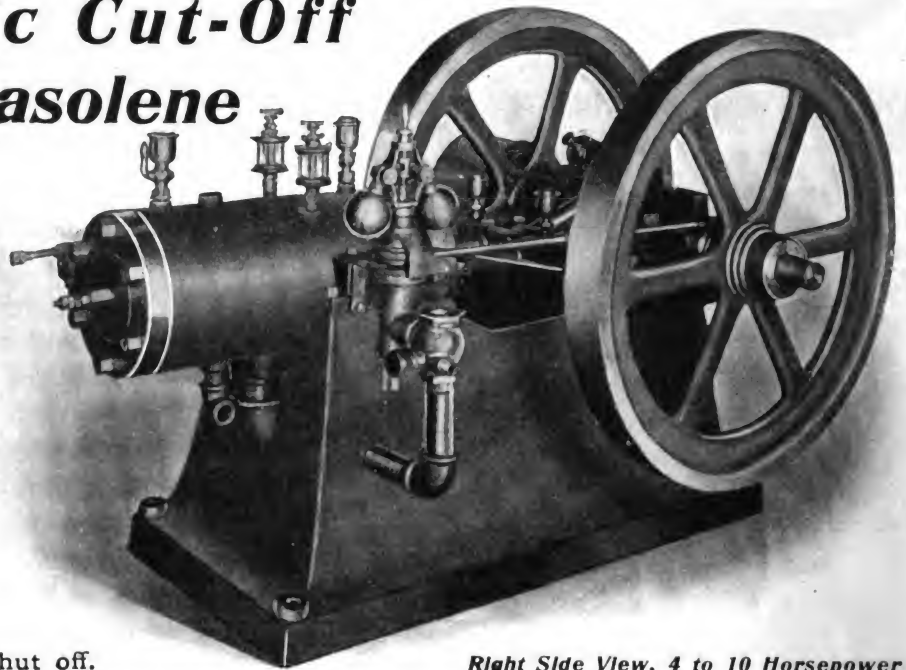
Straight line piston.

No wear on the cylinder.

Every working part on the outside except the piston.

Starts instantly.

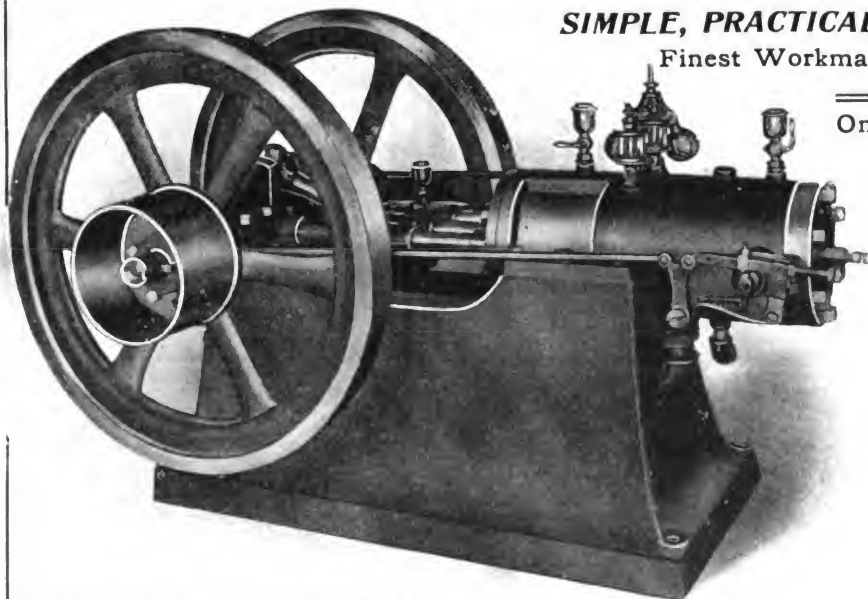
Never stops, only when shut off.



Right Side View, 4 to 10 Horsepower

Special 30-Day Offer. We Pay \$100.00

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Finest Workmanship. Perfect in every detail.

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THE ROBERTSON MFG. CO.

Buffalo, N. Y.

Gentlemen:—The gas engine I bought of you last December does all you claim for it. It is giving us more power than we expected and is so simple that any intelligent boy can run it, and it is economical on fuel.

Very respectfully,
(Signed) GEORGE LAWRENCE.

If you are in the market for an engine that you can always depend upon, write us at once enclosing coupon.

COUPON

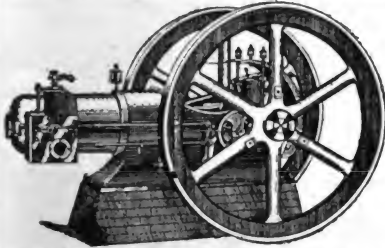
*This entitles holder to our offer in January 1905
American Blacksmith*

The Robertson Manufacturing Co.
High Class Engine Builders ***Buffalo, N. Y.***

DON'T BUY GASOLINE ENGINES

Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

THE TEMPLE PUMP CO., Established 1853. Meagher and 15th Streets, CHICAGO.



Do Not Lose the Opportunity to secure an engine at MANUFACTURER'S COST. I have about 75 engines left of the 950. Place your order before they are all gone.

Address
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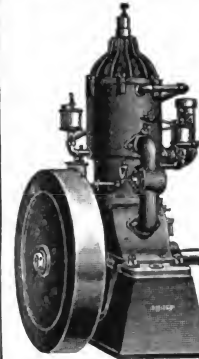
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New York to Chicago*

The Erie Railroad System's Industrial Department has all the territory traversed by the railroad districted in relation to resources, markets and advantages for manufacturing, and can advise with manufacturers of specific products as to suitable locations, furnishing them with current information of a comprehensive nature, dealing with the project in its full relation to manufacture and commerce.

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LUIS JACKSON

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Kerosene Oil Engines

MARINE, STATIONARY, PORTABLE
NO DANGER.

Maximum power. Lightest Weight. Simple, reliable, economical. No Batteries, Self-ignition by compression. Fully Guaranteed.

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MADE EASY**

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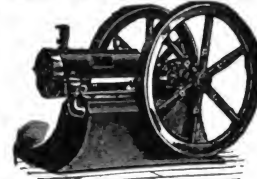
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Write to-day to
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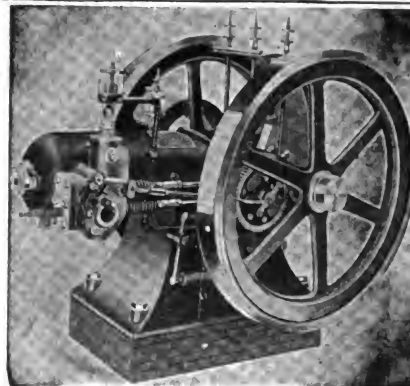
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H. P.

COMPACT
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GAS AND GASOLINE ENGINES.

Simple, Economical, Durable. You need one in your business. Write for circular and prices.

CHICAGO WATER MOTOR AND FAN CO.
22-24 S. Canal St., Chicago, Ill.



Model Gas and Gasoline Engines

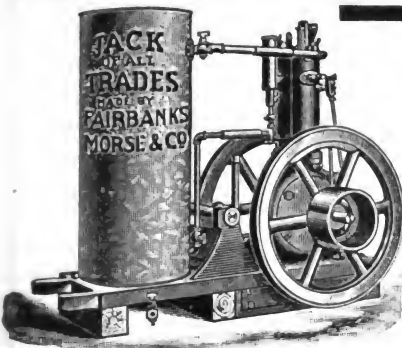
Water or Oil Cooled

The most economical and simplest engine on the market. No cylinder head packing to blow out, and with our automatic sensitive governor, absolute regularity of speed. Stationary, Portable, Horizontal, Vertical Hoists, Pumping and Marine. Send for Catalogue No. 11.

We build the best launch engine of 3 and 6 H. P., with Reversible Bronze Propeller Wheel and Ideal Muffler.

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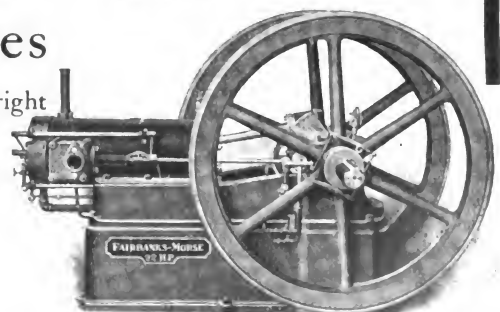
THE JACK OF ALL TRADES GASOLINE ENGINE

Develops over 2 H. P. It costs very little.

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Fairbanks-Morse Gas or Gasoline Engines

Are best for the Blacksmith or Wheelwright



They develop more power for the money than any other. Get our catalogue and prices before purchasing elsewhere. Address nearest house.

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IT PAYS To Buy The Best

SIMPLICITY

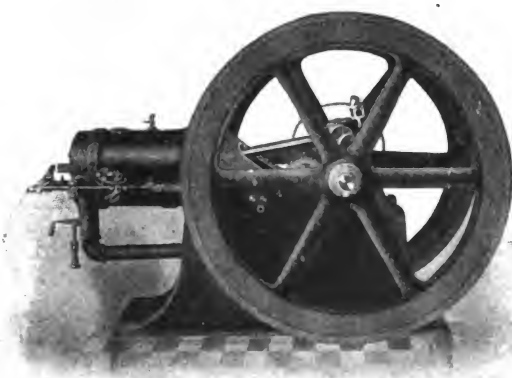
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Gas and Gasoline Engines
cannot be excelled

*The Engine that made
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Simple in construction.
Easy to operate.
Smooth running.
Requires little atten-
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We manufacture every
part and have them
tested by careful work-
men. Shipped on trial
and fully guaranteed.



6 HORSE-POWER SIMPLICITY

We solicit Blacksmiths' Trade, especially, for we are positive of pleasing them. Our engines are sold everywhere and never fail to give satisfaction. They will run when all others stop. Every engine an ad. Every customer our agent. CATALOGUE FREE.

*Let us send you one on trial, and if
it don't answer every requirement—ship it back
at our expense*

Western Malleable and Grey Iron Mfg. Co.

8-20 CHASE STREET, MILWAUKEE, WIS.

It's the
SPARK
that
COUNTS



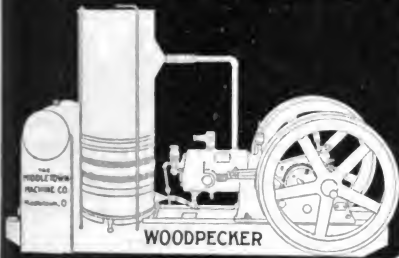
YOUR ENGINE will work better, give you less trouble and carry a bigger load, if you ignite with one of our **Improved Mueller Spark Coils**.
Furnished for use with batteries or dynamo. **WE GUARANTEE** our coils against all imperfections in workmanship and material.
If your engine doesn't ignite properly, write us. Information cheerfully given. Correspondence solicited.
INDUCTION COIL CO.
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In Illinois, Wisconsin, Iowa, Minnesota, Upper Michigan, North and South Dakota, write to W. B. Davenport, Industrial Commissioner, 1329 The Railway Exchange, Chicago.

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WILL IT PAY TO WAIT?



until your competing blacksmith has put in a gasoline engine and, by being able to do much more work at less cost than you, captures the cream of the business? We know it won't pay you to wait, but maybe you don't see it that way, and the only way we can show you is to ship you a 3½ horse power "Woodpecker," or larger size, and let you try it

Thirty Days Free,

under your own eye and your own conditions. We are willing to do this, and if you find it don't pay, you have not bought the engine and all you have to do is to send it back. If the engine itself don't convince you in thirty days that it is a paying investment, we have no right to expect you to buy one and you won't be foolish enough to do so. We are willing to take the chances of its pleasing you, because we know what this engine will do. A one cent postal card will bring you the whole story by addressing

"Woodpecker,"

Box 100, Middletown, Ohio.

All sizes up to 28 horse power, shipped complete, ready to run on any dirt or board floor, without a foundation.

TOOLS

FOR THE
HORSESHOER

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IS OUR SPECIALTY

Electric Sharpening Hammer

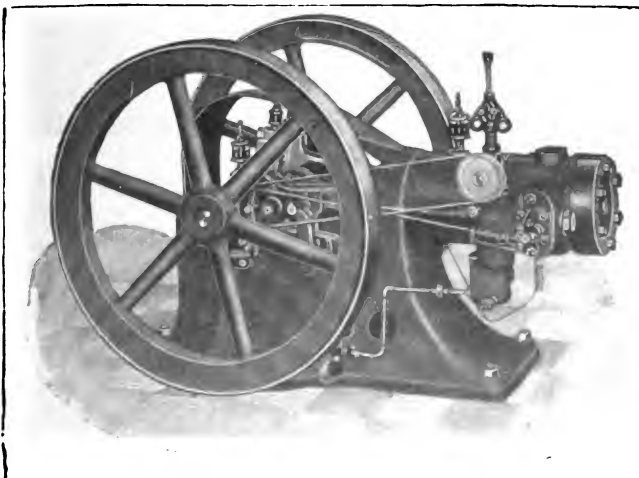
FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

Champion Tool Co.

Meadville, Pa.

ARE YOU READY

FOR AN ENGINE? IT WILL PAY YOU TO SEE US BEFORE BUYING. WE MAKE GAS AND GASOLINE ENGINES OF THE VERY BEST QUALITY; ENGINES PERFECT IN EVERY DETAIL. WATKINS ENGINES SELL ON THEIR MERITS. THEY ARE EASY TO OPERATE, STRONG AND DURABLE; MADE OF FIRST CLASS MATERIAL AND CONTAIN THE BEST WORKMANSHIP. THEY GIVE SATISFACTION EVERYWHERE—VALUE RECEIVED EVERY TIME. BACKED BY THOUSANDS OF CONTENTED CUSTOMERS, WE FEEL SAFE IN SAYING—"WATKINS ENGINES ARE THE BEST ON EARTH."



GENTLEMEN—The 2 h. p. engine I bought of you about a year ago is doing fine. I run one forge fan, one ventilating fan, one trip hammer, one band saw, one drill press, one emery wheel, and can run them all at one time, if necessary. I never saw the time but what I had some power to spare. I have not paid but one cent for repairs. The oil is all it cost me, and I can truthfully say that I never tried to start it any time that it failed to start in the first attempt. There is no bother, no expense. It is the best engine on earth.

A. M. SPEER, Jewett, Ohio.

GENTLEMEN—The 4 h. p. gasoline engine we bought of you January, 1902, has given us entire satisfaction in every respect. We use it in grinding plow points, a band saw, drill, and have plenty of power left. We have no trouble in running and taking care of engine. You would be surprised to see the work we do with the engine. We can recommend it to any one wanting power, and it is always ready for use. We think it the best gasoline engine on the market.

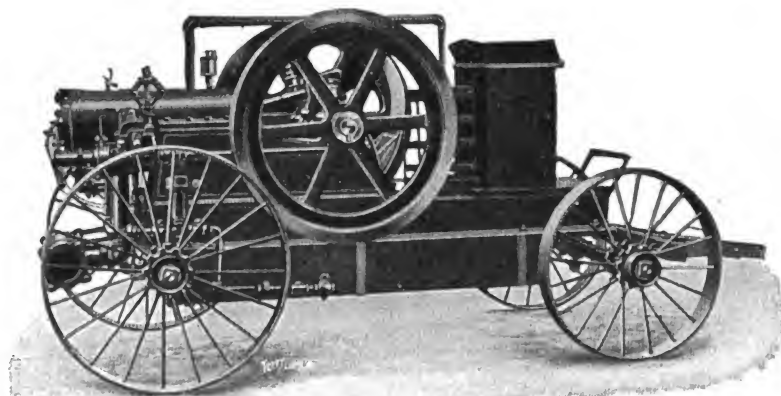
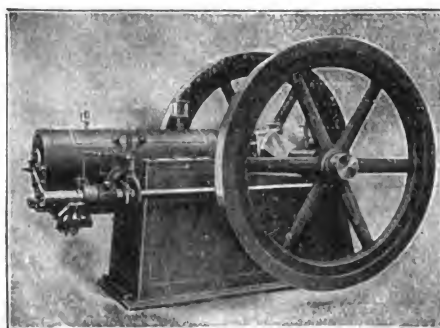
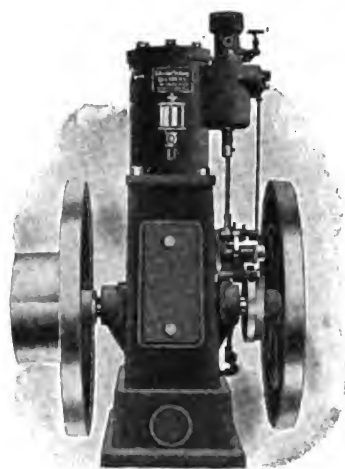
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Stationary
Portable
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Gas and
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Engines



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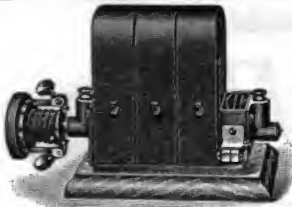
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Fires your gas or gasoline engine without the aid of batteries.
It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to Imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

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FOOL-PROOF BECAUSE IT'S SO SIMPLE

The ELI Gasolene Engine is the BEST because it has no gears, cams, levers, or valve mechanism. **DON'T BE JOLLIED** into buying a complicated engine that's always out of order—get the ELI—no trouble then. Now get busy, brother, and write for booklet to-day.



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THE
ELI
GASOLENE
ENGINES



"It's what's in 'er 't makes 'er go"

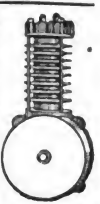
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Engine made. Never gets out of order. Just think, about a cent an hour per horse power. Thousands in use. 1 1/2 to 40 h.p. Two years' guarantee. We also carry wood working machinery, shafting, hangers and pulleys.

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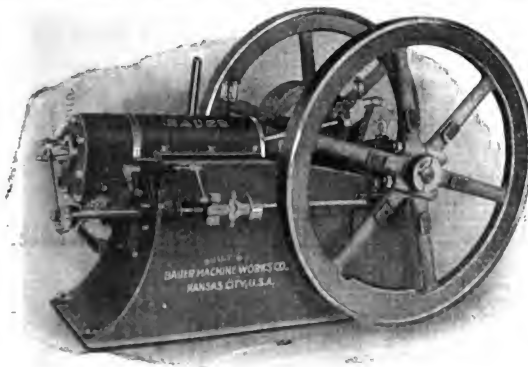
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The Acme of Simplicity and Perfection.

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THE FIRST BLACKSMITH in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily. The Bauer is the best.

Write us Today.

Bauer Machine Works Co.
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The accompanying cut represents

Guaranteed First-class In every respect.

The Baker Engine

Complete, Ready to Run.

It is cooled by water evaporation, the simplest and most desirable method for small engines. The cylinder cannot therefore become warmer than the boiling point, which is not too high for good lubrication. Air and oil-cooled engines often become so hot that they waste a large portion of their power in friction and work injury to themselves.

To prevent freezing it is only necessary to empty a small quantity of water.

No troublesome gasoline pump, and yet not a gravity feed. The gasoline is drawn up by the engine piston.

Electric ignition, and an extremely accurate governor located well out on the fly wheel.

Liberally designed, perfect combustion, and high efficiency.

Best material and workmanship throughout. Made in two sizes, 1 1/2 and 3 1/2 horse-power, by

The Baker Manufacturing Co.
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Established in 1873. Capital, \$400,000.00. Factory operated on the profit-sharing plan.

Also Manufacturers of

Wind Mills, Pumps, Tanks and Feed Grinders



New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.



Write for circular and particulars.

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THE HELLFIRE ELECTRIC BLOWER

This blower has been designed especially for the blacksmith, and it is his ever-ready helper, working for a few pennies a day. It places him on an equal footing with the largest steam shops and allows him to work steadily at the anvil while his work is being "electrically" heated.



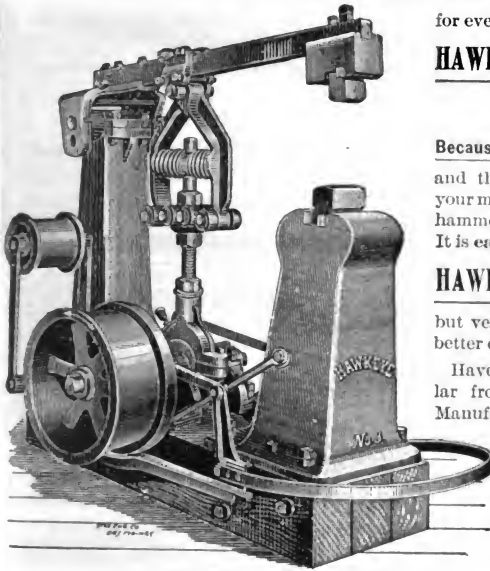
The cost of operating is very low, practically the same as that of a 16-candle power electric light. The electric light companies usually charge only \$1 a month to operate them. These outfits are equipped exclusively with General Electric Motors, which are recognized as the most reliable and durable for this purpose.

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HAWKEYE Power Hammers

A HAPPY AND PROSPEROUS NEW YEAR



for every one who buys a
HAWKEYE HAMMER.

WHY ?

Because they are Dandles
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 It is easy to operate the

HAWKEYE HAMMER

but very hard to get a
 better one.

Have you had a circular
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 build? If not,
 better write for
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HAWKEYE MANUFACTURING CO.,

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Velox Emery Grinder

Combines proper
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RIGID FRAME,

**Adjustable
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**MOUNTED AND LOOSE
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 WAGON JACKS**

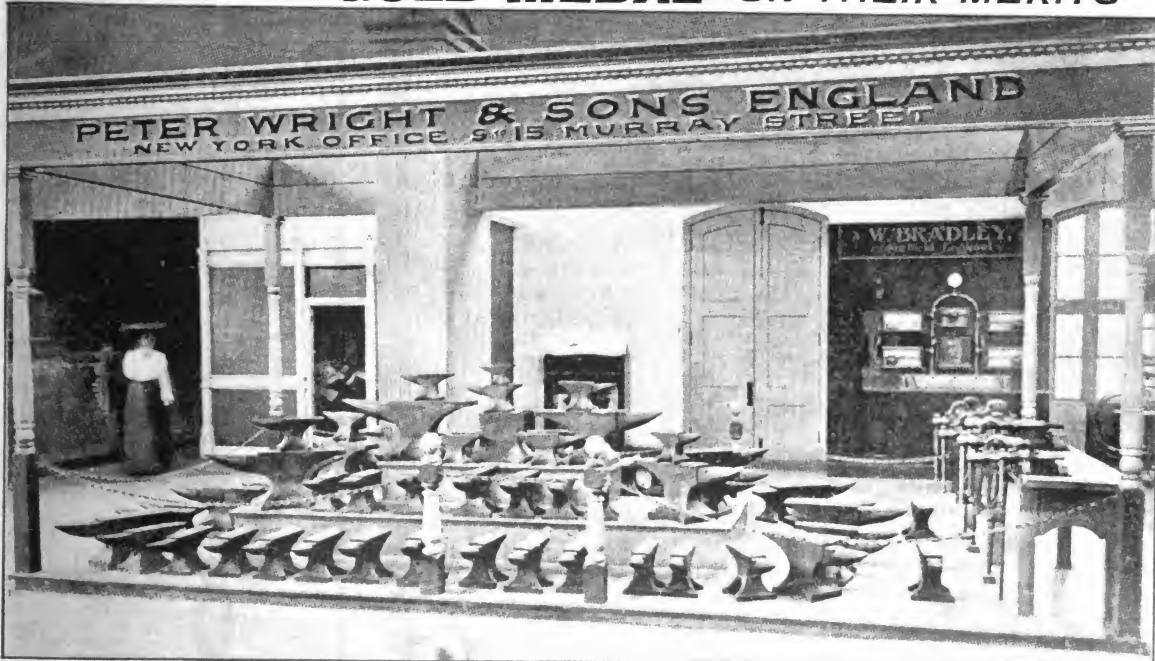
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Wilcox Manufacturing Company,

AURORA, ILL. U. S. A.

PETER WRIGHT AND SONS ANVILS

RANK ABOVE ALL OTHERS. AT THE LOUISIANA PURCHASE EXPOSITION THEY WERE
 AWARDED A "**GOLD MEDAL**" ON THEIR MERITS



OUR EXHIBIT AT ST. LOUIS, UPON WHICH WAS BESTOWED HIGHEST AWARDS BY THE EXPOSITION JURY

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Horse, Fetlock and Barber's Clippers**

Specify for Hotchkiss Clippers. They are goods that will stand the test of time. Send for 1905 Catalogue.

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Highest Quality and Workmanship Guaranteed

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TO SEE THAT YOU ARE SUPPLIED WITH THE BEST TOOLS ON THE MARKET

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TO FURNISH THESE ARTICLES AT THE LOWEST POSSIBLE PRICES

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WE BOTH REALIZE
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WILL STAND MORE ROUGH USE THAN ANY OTHER SAW MANUFACTURED.
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WE CLAIM THAT OUR UNIVERSAL EXTENSION FRAME MEETS EVERY REQUIREMENT, AND IS ACKNOWLEDGED BY THE TRADE TO BE THE BEST ON THE MARKET TODAY. AFTER YEARS OF EXPERIENCE, WE HAVE PRODUCED A FRAME HAVING THE ESSENTIAL QUALITIES. IT IS LIGHT, STRONG AND DURABLE.

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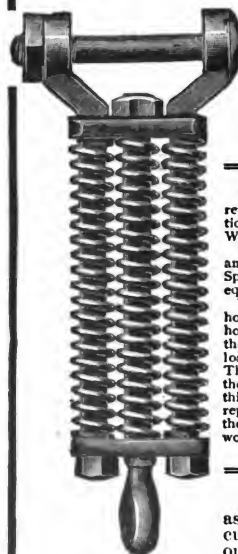
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All wagon owners need them.



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They act as a cushion to the horses' shoulders, they help horses START heavy loads, they assist in drawing the load after it is in motion. They prevent collar wounds; they save from twenty to thirty per cent. in harness repairs; prolong the life of the team and increase their working capacity.

You can make money as well as please your customers by selling our Springs.

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New Catalogue Mailed Free on Application.

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SEBASTIAN LATHES ARE GOOD LATHES

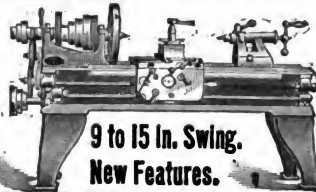
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Foot Lathes, Tools and Supplies

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124-126 Culvert Street

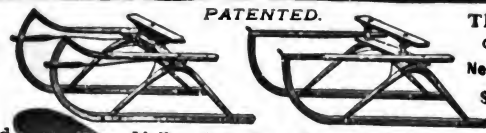
Cincinnati, Ohio



9 to 15 in. Swing.
New Features.

Success Oscillating Sleigh Knees.

For farm, road and lumbering Bobs. Sizes, 1½, 1¾, 2, 2½, 3, x 3½ in. runners. Satisfaction Sure. Try Sample Set.



Valley City Bent Knee Bob Sleighs

For Pleasure, Delivery, Express, Sleigh, etc.

The Strongest, Neatest, and Best.


THIS is the Brown Oscillating Sleigh Knee. Needs No Recommendation. Satisfaction Guaranteed.

Sizes, 1½, 1¾, 1½, 2, 2½, 3 and 3½.


Write us.



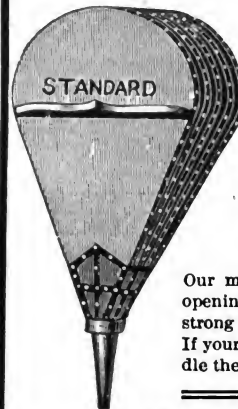
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Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, etc.
Geo. M. Ness, Jr.,
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Price list sent upon application.



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Standard and Extra Long
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Our make has the large openings, giving a long, strong and steady blast. If your dealer does not handle the "Bullock," write us.

Established 1865

T. H. Bullock Bellows Co.

130-132 COLUMBUS ST.
CLEVELAND, OHIO

"I'LL BE HANGED IF I COULD DO WITHOUT IT,"

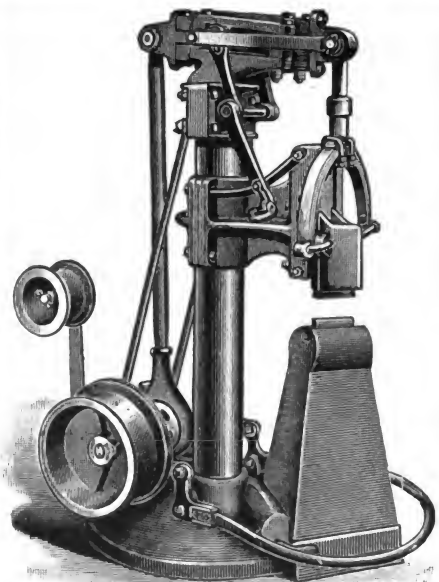


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YOU can't afford to be without it.

BETTER THAN A HELPER.

"Any force of blow at any speed."



MODERN POWER HAMMER.

GRINNELL MFG. CO.

GRINNELL, IOWA

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2 feet long, 3/4 inches wide, folding in middle. Made of Best Quality Spring Tempered Steel.

BLACKSMITHS Will find this Steel Rule just what they need. We send it post-paid for 50 cents.

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Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals, and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : :

Hand Forged Butcher Knives

Ground, Tempered, and all ready for the handles, either round or riveted, for 15 cents each or \$1.50 a dozen. All sizes from 5-inch to 8-inch. These blades are made from Sanderson Steel and warranted. Will replace any imperfect knife with two new ones. Handles all ready to put on, one cent each. Hand Forged Razors, ready to use, 40c. each; Pocket Knife Handles, in great variety, 10c. Try a sample. Hundreds of Smiths are using these blades and make money and friends selling them. Liberal discount in quantities. Address

WOODWORTH KNIFE WORKS, - NUNDA, N. Y.
ESTABLISHED IN 1876.

TIRE SHRINKER

TIRE BENDER

FOR PROGRESSIVE BLACKSMITHS

IDEAL

WRITE FOR DESCRIPTIVE CIRCULARS THE WEYBURN CO. ROCKFORD, ILL. U. S. A.

PLOW SHARE AND OTHER STEEL SHAPES.

BLAKELEY TUVREY IRON.

THE "BUSH" Low-down Handy Wagon

WITH 4-IN. TIRE STEEL WHEELS



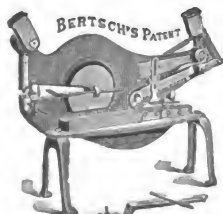
We make any size wheels to fit any skein.

WRITE TO **C. BUSH,**
QUINCY, ILL.
(MENTION THIS PAPER.)

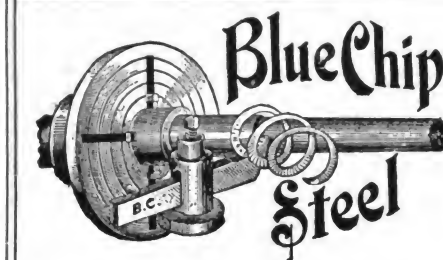
**RUBBER STAMPS
STEEL STAMPS
AND STENCILS**
SEND FOR CATALOGUE.



A. C. GIBSON CO.,
338-340
WASHINGTON STREET
BUFFALO, N. Y.



**We Manufacture
SHEARS
AND
PUNCHES**
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
BERTSCH & CO.
Cambridge City, Ind.



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.
PITTSBURGH.

Selling Agencies:

**NEW YORK CHICAGO
BOSTON PHILADELPHIA**

AIR CUSHION RUBBER HORSESHOE PADS



See That Cushion?
It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

**NO
LAMENESS
NO
SLIPPING
CHEAPEST
AND
BEST**



Medium Canvas Back

REVERE RUBBER CO.

Sole Manufacturers BOSTON, MASS.

ATTENTION! !

We want you to represent us in your locality, selling

The Victory Corn and Feed Mills.

**OLDEST AND BEST
GRINDING MILL MADE.**

**STRONG,
SIMPLE,
DURABLE.**

Especially adapted to grinding ear corn, shelled corn, wheat, oats, rye, etc.

WRITE FOR PRICES AND PARTICULARS TODAY.

THOMAS ROBERTS.

(Established 1876.)

Springfield, Ohio.

Bolster Springs

ALSO WAGON SEAT,
TRUCK AND PLATFORM SPRINGS



Sold by leading Jobbers, or write us

HARVEY SPRING CO.
RACINE JUNCTION, WIS.



"QUICK ACTION"

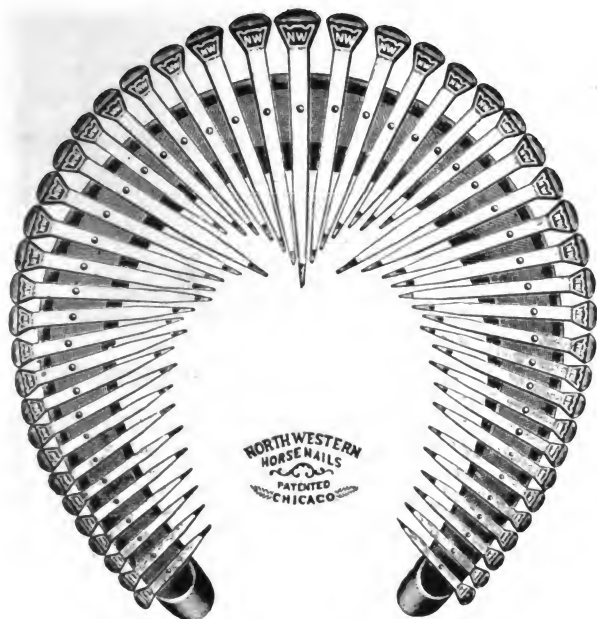
IGNITING DYNAMOMETER

Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue E.

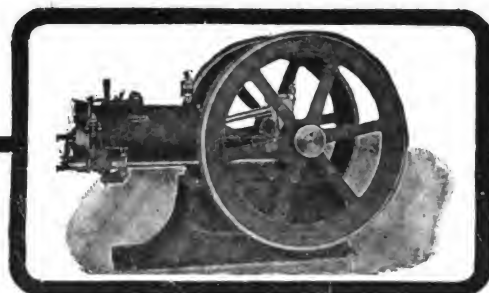
The
**Knoblock-Heideman
Mfg. Co.,**
SOUTH BEND,
IND.

NORTHWESTERN HORSE NAILS



Made of the best Swedish iron. The most perfect in form and finish. Will hold a shoe longer than any other nail made. The REINFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY
CHICAGO, ILL.



The Top Notch of Satisfaction Is Attained
In our Line of

BADGER GAS AND CASOLINE ENGINES

STATIONARY—PORTABLE—TRACTION—MARINE

THEY ARE UNEXCELLED

For great power at low fuel consumption.

For quiet and smooth running qualities.

For general reliability and easy starting.

For regularity of speed and close regulation of power.

We do not make a cheap engine, but cater to that class of buyers who wish a first-class article, something that will not mean continual trouble and repairs. A cheap engine is a very expensive machine at any price.

We want blacksmiths everywhere to act as agents for this, the most complete, successful and best money-making line of gasoline engines on the market.

Every engine sold on trial, satisfaction guaranteed. Write at once for exclusive agency, prices and terms.

Handsome 48 page Catalog Free.

C. P. & J. LAUSON

Manufacturers

101 W. Water Street, - MILWAUKEE, WIS.

The J. D. Hammer

Built especially for carriage and repair shops.

A Foot and Power Hammer Combined

AS A POWER HAMMER

All heavy work, such as welding stubs, heavy machine work and sharpening plows can be done on this hammer. Iron 8 $\frac{1}{4}$ inches square may be cut, or you can upset an iron 10 inches long, as hammer strikes the same blow 10 inches above the anvil as it does on the anvil. Strikes about 800 blows per minute.

AS A FOOT HAMMER

This hammer, may be instantly and easily changed from belt to foot power. For welding, rounding, flattening, swaging, cutting iron or any place you can use a helper, this hammer is always ready. It will strike as hard a blow with foot power as it will with the belt, only not quite as fast.

DO NOT BUY A HAMMER

that you can't get a stroke out of without starting an engine. The J. D. is the best all around hammer. None better for plow work. Twenty inches between dies when hammer is at highest point.

Any tools that are used on anvil can be used with this hammer. Shipping weight 1400 lbs.

Write for prices and full description.

Jinks & Davis
Morris, Kansas



GOOD DRILLS

The old reliable

"BURNHAM"

Drills for Power

Also Hand Power

Francis Reed Co.

43 Hammond St.

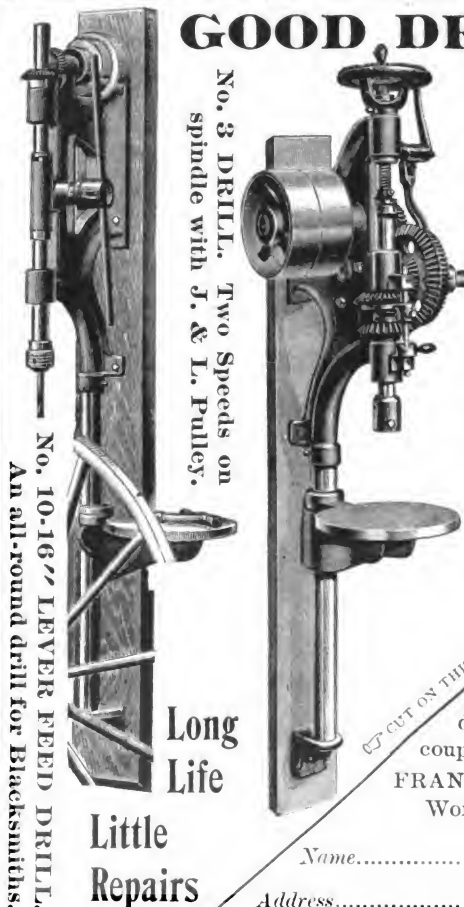
Worcester
Mass.

A. B.

If you want a first-class drill, cut out this coupon and mail it to
FRANCIS REED CO.
Worcester, Mass.

Name.....

Address.....



CUT OUT ON THIS LINE

Long Life

Little Repairs



Adjusts to Any Top

Place one hook over a prop, draw the other hook over and hook it over the other prop. An elastic cord connects the two hooks and holds the storm front securely in place on any size top.



Adjusts to Any Bow

Each side has but one fastening and is fastened by shoving the V-shaped clamp in the bow. Easy to put on, yet it stays.

TRADE
BLIZZARD
MARK
ADJUSTABLE
Storm Front

Highest Award World's Fair.



PATENTED
Adjusts to Any Buggy

Closes up a buggy and keeps out the cold and rain and the occupants have plenty of room.

The transparent celluloid window is 12x20 inches and will not break and is not affected by the cold.

The line pocket is 14 inches wide, the hole through which the lines pass is reinforced with a piece of light metal. The lines can't tear out the metal hole.

No Measuring Required.—The Blizzard Storm Front is adjustable and fits any buggy.

The weight is only 5 lbs. It can be folded up and placed under the cushion.



Adjusts to Any Dash

At the dash is another elastic cord, and a hook at each side. Place a hook on one side of the dash, draw the other hook over and place it in the other side. The elastic cord is strong and guaranteed.



To Open the Side

Hit the V-shaped clamp with the palm of the hand and the side flies open. This is the best feature of the Blizzard Storm Front.

BLACK RUBBER, \$3.50

**DISCOUNT
TO DEALERS**

GREY RUBBER, \$4.00

From now until the March blizzards are over is the best time to sell Blizzard Storm Fronts and

We Want a Good, Active Agent in Every Town

in the country; hence this large announcement to secure them at once. Write to the
VEHICLE APRON & HOOD CO., Columbus, Ohio, for our 1905 CATALOGUE AND PRICES.

Any Jobber who handles your supplies will furnish you with "Blizzard" Storm Fronts

THE VEHICLE APRON & HOOD CO. 302 N. 4th Street,
COLUMBUS, OHIO.



DON'T BE SATISFIED

with any old kind of a **Screw Plate**. Be up-to-date and get one of the Celebrated "**Reece**" **Screw Plates**,—the kind that have the **Adjustable Guide**—the kind that make **Perfect Threads at One Cut**—the kind that are **Simplest, Easiest Cutting and Most Durable**. That's the kind **Reece** makes, and if you want to do your threading **Cheaper, Quicker and Better**, then get a set of **Reece's Stocks, Taps and Dies**.

Satisfaction Guaranteed.

Over **Fifty** Assortments to select from.

We wish to place in the hands of every user of Taps and Dies, a copy of our 84 page Catalog. Write us at once for this Catalog if you are interested.

SPECIAL OFFER.—For 85 cts. we will send to any address in United States, a **Fine Set of Bit Brace Nut Wrenches** for $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ " Square or Hexagon Nuts. Do not fail to avail yourself of this Special Offer.

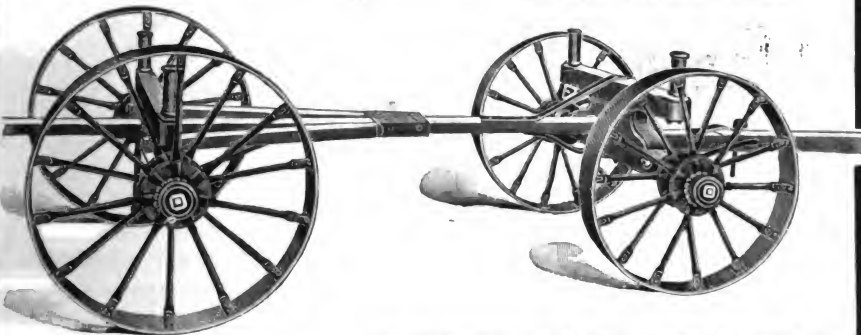
THE E. F. REECE CO., GREENFIELD, MASS., U. S. A.



Our Wheels are **Made of Steel**
Made to Fit Any Wagon

Our **Wide Tired Wheels** are substantially and thoroughly put up. Built in any width, for any load, to fit anybody's wagon. Every **Blacksmith** knows that farm wagons sell quicker when they have our wide tired, low down wheels. They save time and hard lifting and they make wagons haul easier, because they do not cut into road or turf.

Strongest and Most Durable.



We make wheels, gears, complete wagons and gasoline engine trucks, wood or steel axles (one or two horses.)

Write for our Catalogue and Net Prices. They will interest you. We are establishing an agent in each town. Ask for further particulars.

Geneva Metal Wheel Co., 15-25 Railroad Street, Geneva, Ohio.



No Matter What You Want to File

- Notes —Docum'ts —Card Records
- Checks —Samples —Legal Blanks
- Letters —Invoices —Credit Reports
- Clippings —Reports —Deposit Tickets
- Papers —Books —Insurance Policies

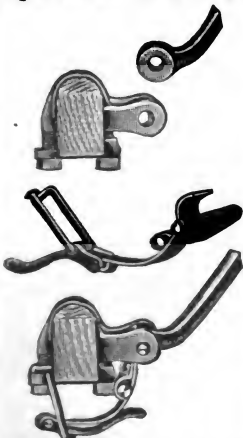
there is a **SHAW-WALKER** way to do it.

And that way we **guarantee** is best and ask nothing but return of goods if after trial you do not think so

Check in the list above those items that interest you—tear out this advertisement and mail to us. That's the first step in simplifying your office or factory detail. And do it NOW.

The Shaw-Walker Co., Muskegon, Michigan

.. IMPROVED ..
FERNALD
QUICK SHIFT.

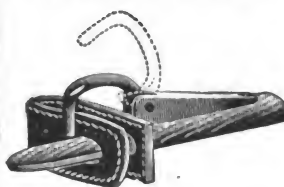


Patented June 13, 1899.
Dec. 22, 1903.
Canada, July 17, 1899

NEARLY
300,000
Fernald
Quick
Shifters

Sold in the last
12 months.

Patented Nov. 15, 1904.
FERNALD DOUBLE
TRACE HOLDER.



The Fernald Double
Trace Holder is

Something New

Sample
Pair by
Mail... **25c**

FERNALD MFG. CO. NORTH EAST, PA.

"THE ONLY WAY"

BETWEEN
CHICAGO
ST. LOUIS
KANSAS CITY
AND
PEORIA

Handsomest, most
luxurious trains in the
world; completely
rock-ballasted road-
bed, no dust, no dirt,
no smoke, no cinders.



THE
ALTON'S
1905
GYPSY
GIRL

Copyright, 1904, by the
Chicago & Alton Railway Co.

Sequel to the famous
"Fencing" and "Cow-Boy"
Girl Art Calendars.

ART
CALENDAR

FIVE SHEETS, EACH 10 X 15 INCHES

SEND 25 CTS.

with name of publication in which you read this advertisement, to **GEO. J. CHARLTON**, General Passenger Agent, Chicago & Alton Railway, Lock Box 618, CHICAGO, ILL., and get the handsomest calendar of the year. Four graceful poses in colors, unmarred by advertisements and ready for framing.



Round Pattern

ROUND PATTERN CALKS are familiar to all blacksmiths, but we can assure you that our round calk is superior to any calk on the market.

Improved shape and no special wrench required.



Can't Slip Pattern

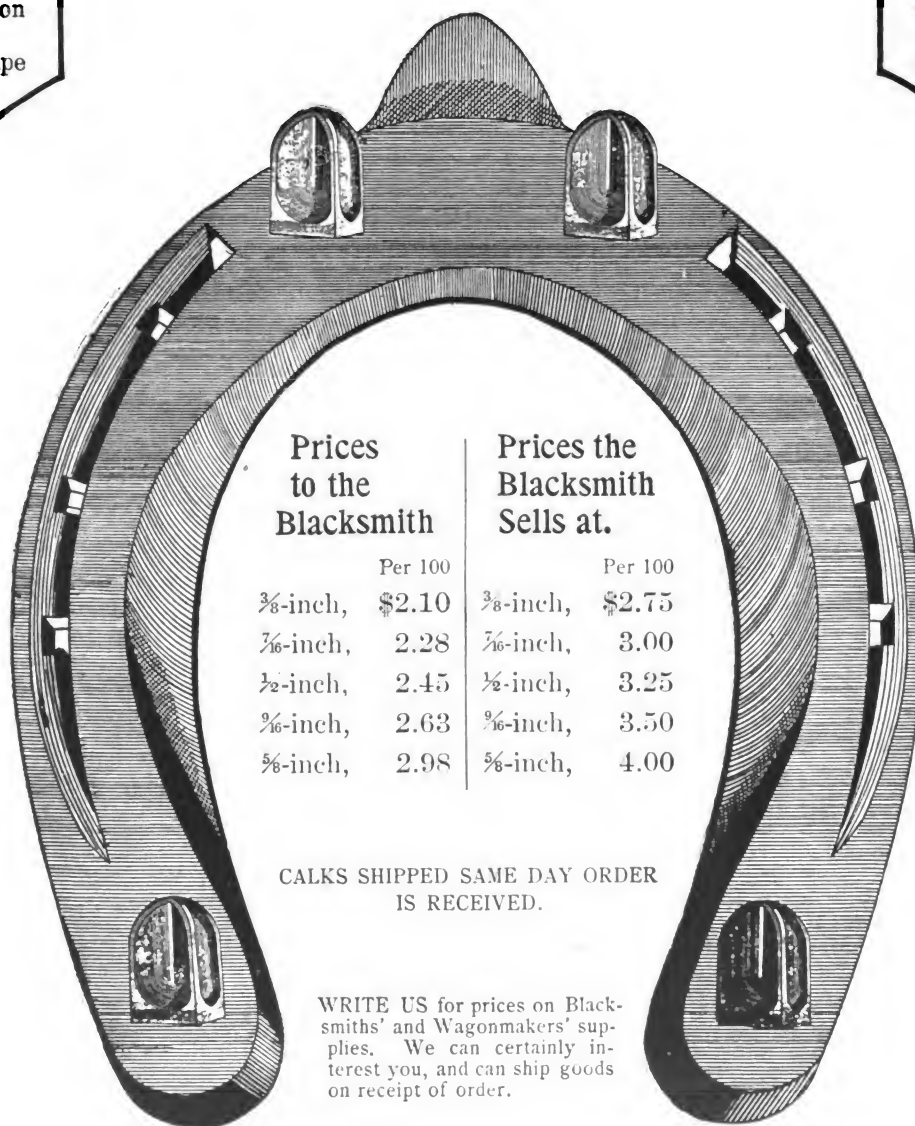
Our CAN'T SLIP CALKS are built for business. Always sharp, drop forged from high grade steel and rolled thread.

Large wearing surface. No point to wear blunt.

If you have found other makes of calks wearing out too fast, why not try Can't Slips and satisfy your customers?

WILLIAMS' CAN'T SLIP Removable Calks

BLACKSMITHS can make a nice profit selling our calks, and are protected.



Prices
to the
Blacksmith

Per 100

$\frac{3}{8}$ -inch,	\$2.10
$\frac{7}{16}$ -inch,	2.28
$\frac{1}{2}$ -inch,	2.45
$\frac{9}{16}$ -inch,	2.63
$\frac{5}{8}$ -inch,	2.98

Prices the
Blacksmith
Sells at.

Per 100

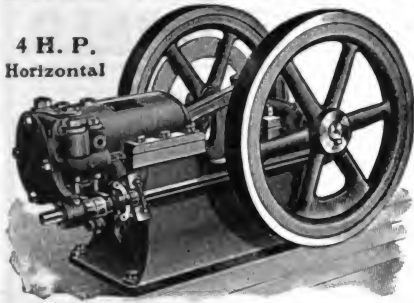
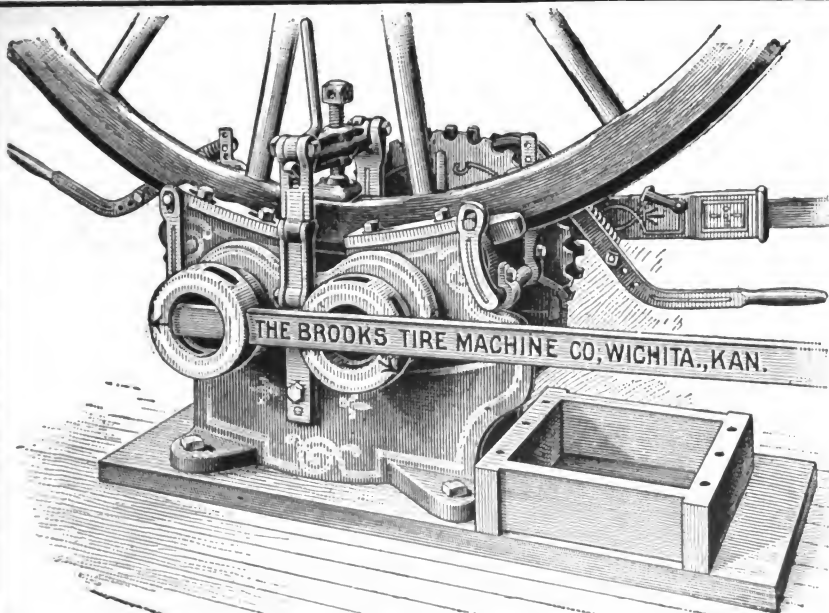
$\frac{3}{8}$ -inch,	\$2.75
$\frac{7}{16}$ -inch,	3.00
$\frac{1}{2}$ -inch,	3.25
$\frac{9}{16}$ -inch,	3.50
$\frac{5}{8}$ -inch,	4.00

CALKS SHIPPED SAME DAY ORDER
IS RECEIVED.

WRITE US for prices on Blacksmiths' and Wagonmakers' supplies. We can certainly interest you, and can ship goods on receipt of order.

Bittenbender & Co. 126, 128, 130, 132 Franklin Avenue, Scranton, Pa.

LITTLE GIANT GAS & GASOLINE ENGINES

4 H. P.
HorizontalEither tube igniter or
electric igniter. Shipped
mounted on skids, if de-
sired for farm use.2½ H.P.
VerticalAlso equipped with pumping attachments. Write
for booklet describing full line New Era Gas Engines
from 4 to 100 H. P. Special inducements to dealers
as agents.**THE NEW ERA GAS ENGINE CO.**
No. 63 Dale Ave., DAYTON, OHIO.The Highest Award of Merit
is the Approval of the PublicOur Exhibit at St. Louis was awarded a medal by the Superior Jury of
Awards of the Exposition, but we value more highly than prizes and medals
the decision of the thousands of practical mechanics and users of vehicles
who saw our machines in operation and gave it as their verdict that**THE BROOKS COLD TIRE SETTER**is far superior to all others in the principles of its construction, for dura-
bility and for rapid and accurate work in resetting vehicle tires cold.If you have not seen one do not delay sending for full information with prices
and special winter terms which will enable you to buy one with a small
cash outlay. We ship them on trial and guarantee satisfaction to black-
smith and vehicle owner.Some one in your locality will be using one next season and making
large profits. Will it be you? A postal card will bring particulars.**The Brooks Tire Machine Co.**
121 N. Water St., WICHITA, KAN.A Millstone About
The Neck

Lack of special training is the
"millstone about the neck" of most
men and women in poor paying
positions. It holds them back while
others go ahead. It handicaps
them everywhere. The Interna-
tional Correspondence Schools'
system of training by mail will
enable you to throw off the bur-
den. By this means you can rise
to one of the higher positions in
your present trade or profession.
You can qualify for a more
congenial occupation and better
salary. We have helped thousands
of ambitious people to advance in
salary and position. We can help
you. Decide today to better your
condition.

Mark X before the position that interests you,
fill in the coupon and send it to us. We will
send full particulars.

International Correspondence Schools
Box 1302, Scranton, Pa.

Please send me a free copy of "1000 Stories of Suc-
cess," and explain how I can qualify for position
before which I have marked X.

Mechanical Engineer
Mechanical Draftsman
Machine Designer
Electrical Engineer
Municipal Engineer
Chemist
Sheet-Metal Draftsman
Sanitary Engineer
Electrician
Stationary Engineer
Marine Engineer
Civil Engineer

Bridge Engineer
R. R. Construct'n Eng.
Surveyor
Mining Engineer
Mine Superintendent
Architect
Bookkeeper
 stenographer
Ad. Writer
French With
German Edison
Spanish Phonograph

Name _____
St. & No. _____
City _____ State _____

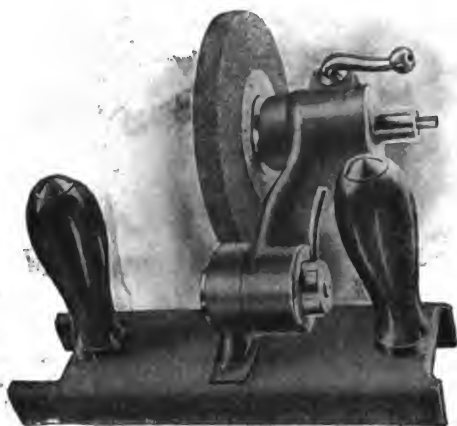
Fac-Simile Letters

FOR
Circularizing and Follow Up Systems

Look like the original
and bring results. Fur-
nished complete with
names filled in or ribbons
to match.

LERNER-BEAN CO.,
363 Washington St., BUFFALO, N. Y.

COATES PATENT TOE CALK SHARPENER



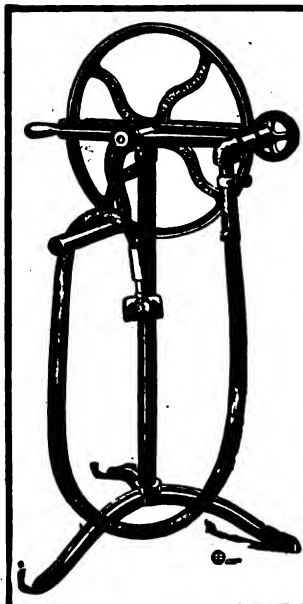
WHY REMOVE THE SHOES FROM THE HORSES' FEET.

Grind them and do it quickly. Retain all your old customers and get new ones, simply by doing good and quick work. Same machine clips horses. *Send for Catalogue No. 29.*

COATES CLIPPER MFG. CO.
WORCESTER, MASS.

ALL OVER THE WORLD The 1902 Chicago Clipper

Price, \$10.75.



"Stewart's Patent" is recognized as the greatest clipping machine ever invented. More of them are sold every day ten times over than all other makes combined. Each one is sold under a positive guarantee to clip faster and turn easier than any other machine made, regardless of price, or money refunded. All gearing is cut from solid metal, and unlike any other machine made, it can be turned with either the right or left hand.

It's Easy Money

blacksmiths make using this clipper. Horse clipping is now a part of every up-to-date horse shoeing establishment. Why, look at the profit. You can clip a horse in 30 minutes with this machine, and every horse owner recognizes the advantages of clipping.

Send \$3.00 and machine will be sent C. O. D. for the balance. Catalog on request.
Yours very truly

Chicago Flexible Shaft Co.

186 Ontario Street, - CHICAGO.

IRON

ANGLES, BARS, PLATES, SHEETS, RIVETS, PIPE,
SHAFTING, TIRE, TOE STEEL, ETC.

STEEL

Kept in stock at Cleveland for immediate shipment,
or forwarded direct from mills at lowest market prices.

SEE MONTHLY STOCK LIST.

**TOOL STEEL,
AMERICAN AND ENGLISH.**

**THE
BOURNE-FULLER CO.**

**IRON, STEEL
PIG IRON
COKE**

Cleveland, Ohio.

ROOTS'

Acme Hand Blower

For Blacksmiths

It has the unqualified
indorsement of
every mechanic who
has used it.



Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

Any smith can now renew the bronze bearings in the new Blower in a very few minutes.

Net price with box and connecting pipe for tuyere

\$15.50

Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
The Leader of Blowers for Blacksmiths.

P. H. & F. M. ROOTS CO.

New York Office:
120-122 Liberty Street

Connersville, Indiana

Chicago Office:
1547 Marquette Building

The Bruce Malleable Wagon Standard

We make the following sizes:
 No. 1, 3 in. wide, 14 in. high
 " 2, 3 1/2 " " 14 "
 " 3, 3 1/2 " " 10 "
 Price, \$1.50 per set of 4 stks
 Cash with order. Weight, 16 lbs.
 per set.



This shows the
 strength of our
STANDARD
 compared to
 the old style.

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented. Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time straightening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 x 3 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. Harshbarger • • • Bement, Ill.

"BRAKE BLOCKS"

With a Record of

SEVENTEEN YEARS!!

Testimonial Book of Facsimile Letters from High Grade Carriage and Wagon Builders with Illustrated Catalog for the Asking.

THE MORGAN POTTER COMPANY

Fishkill-on-Hudson, N. Y., U. S. A.

Who Is a Fossil?

The dictionary says,
 "A fossil is a person or thing that is behind the times, antiquated, or out of date; one whose ideas have failed to keep up with human progress."

Progress:—Buffalo Geared Hand Blowers.
 Fossilism:—Bellows.

Are you a fossil?



The
 Blacksmith's
 Friends



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

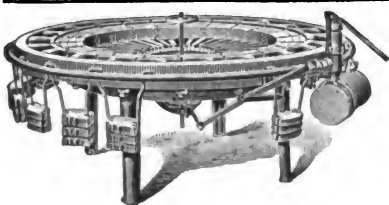
Welds at a low heat, does not fly. Saves time and fuel. Guaranteed to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the Banner Brands.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

INVESTIGATE The Hercules Hydraulic



Before
 You
 Buy a
 Tire Setter

National Machine Co.

KEOKUK, IA.

WRITE FOR THE Tire Setter News

It will tell you
 all about Henderson
 Tire Setters.

Write for information
 about our new HYDRAU-
 LIC SIDE GRIP machine.
 Illustration not out yet.



Standard Tire Setter Co.

KEOKUK, IA.

HAY-BUDDEN SOLID WROUGHT ANVILS

The Gold Medal Anvil
 Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE
 WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

VOLUME 4

NUMBER 5

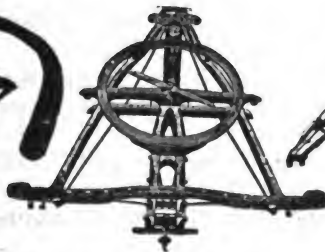
THE AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

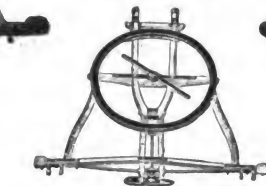
A Practical Journal of Blacksmithing and Wagonmaking

FEBRUARY, 1905

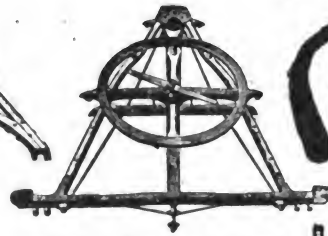
\$1.00 A YEAR
10¢ A COPY



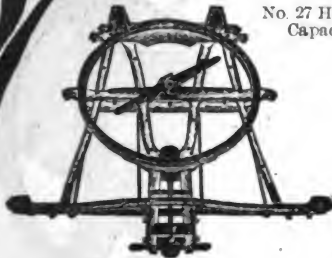
No. 5 L. Selle Patent
Capacity 800 lbs.



No. 27 H. Selle Patent
Capacity 4,000 lbs.

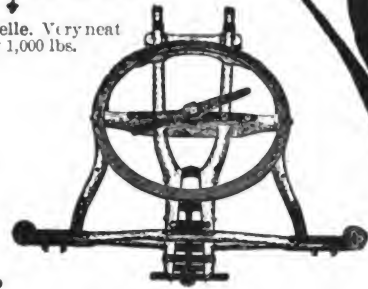


No. 15 B. H. Selle. Very neat
Capacity 1,000 lbs.



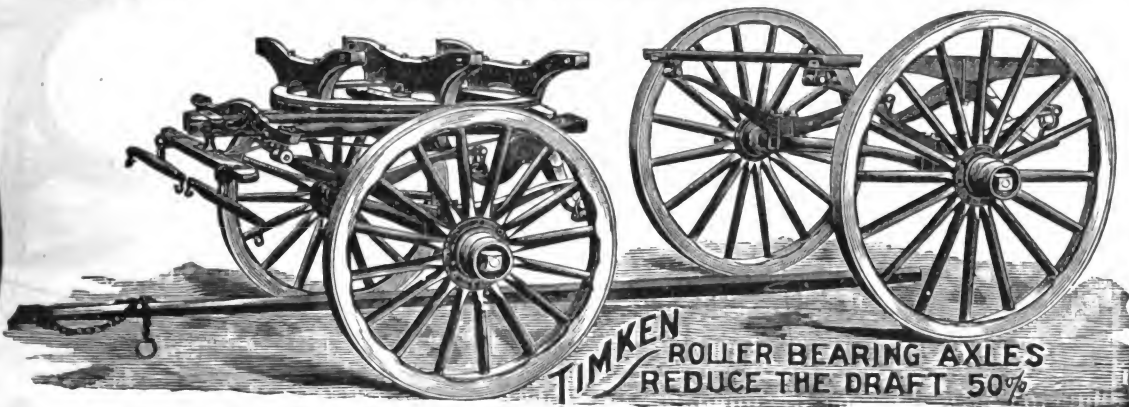
No. 43 B. H.
Capacity 7,000 lbs.

No. 62 H. Selle Omnibus
Capacity 4,000 lbs.



No. 64 H. New York
Capacity 8,000 lbs.

THE
AKRON-SELLE CO.
AKRON, O., U. S. A.

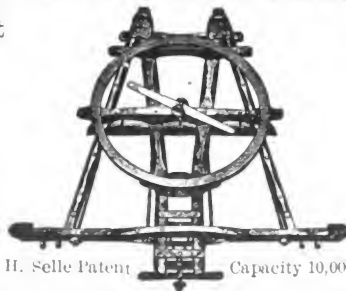


No. 34 H. Selle Patent. Heavy Truck with Timken Axles. Capacity 6,000 lbs.

Sole manufacturers of **GENUINE SELLE GEARS**. Always insist upon your rights and don't be humbugged into accepting imitations. Take no substitutes.

our name **SELLE** on every gear. 1,000 styles and sizes.

Write for catalogue B.



No. 46 H. Selle Patent Capacity 10,000 lbs.

"Wrought Iron Spring and Axle Blocks for all sizes of springs or axles. Can be changed to conform to sweep of spring in a few minutes. Last forever."



No. 19 H. Selle Patent
Capacity 5,000 lbs.



No. 21 H. Selle Patent
Capacity 2,000 lbs.

Carriage Maker and Blacksmith Tools

**Special
Prices to
Carriage Makers
and Blacksmiths
if this paper
is mentioned.**



Fig. 900, 12 inches.

Fig. 900, "Elite," Silver Blower (*patent applied for*) is distinctive in design, has cut gearing and removable, interchangeable bronze bearings for gear pinions. The gearing is self contained and attached to side of fan case, has an outer bearing plate over it and is thus permanently secured so that there is no unnecessary friction or lost power. The gear covering is removable without disturbing the gearing or paddle spider. There is a light tuyere for clay lining and a heavy one to use without lining. All parts are interchangeable.

Fig. 822, Band Saws are made in sizes 20 and 26 inch for foot or belt power and 32 and 36 inch for belt power. They are properly constructed, nicely finished, adapted to factory and repair work of every kind and give unusual satisfaction.

Fig. 718, Spoke Tenon Machine cuts tenons $\frac{1}{4}$ to 2 inches diameter up to 6 inches long and also bores the felloe.

Fig. 709, Taper Hub Boxing Machine is made as illustrated, on legs and also without legs to mount on bench. It bores tapering holes in the hubs for the boxes and cuts the recesses for nuts and collars.

Made also for hand and power.

Also Forges, and a complete line of Hand and Power Drills.

Manufactured by

— THE —
SILVER MFG. CO.,

365 Broadway,

SALEM, OHIO.

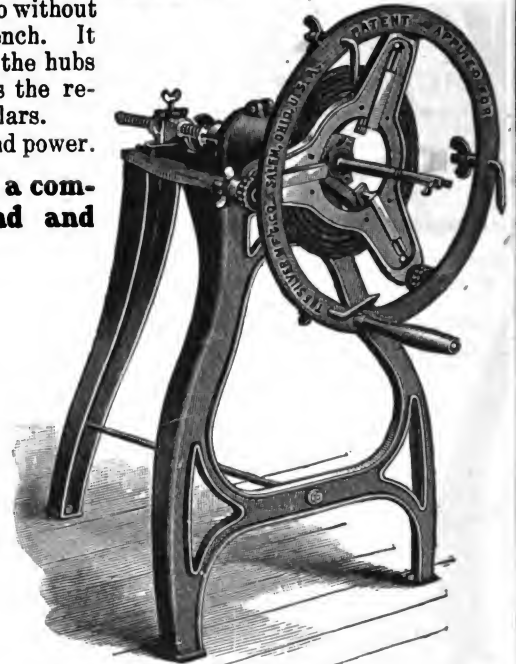


Fig. 709.



Fig. 822, 32 inch.

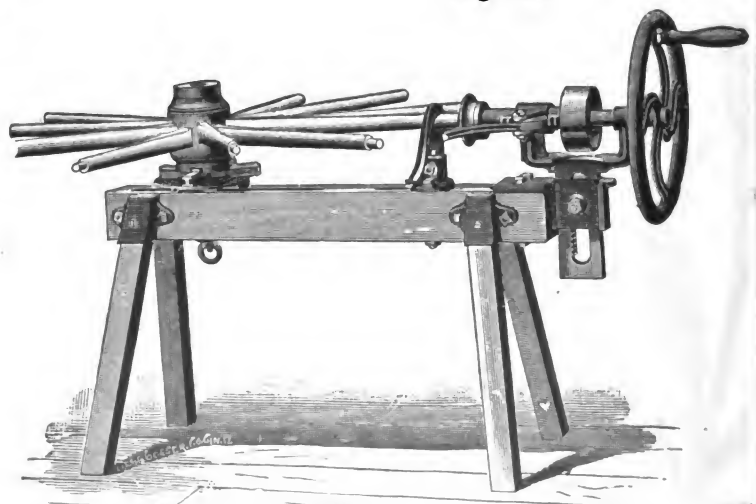
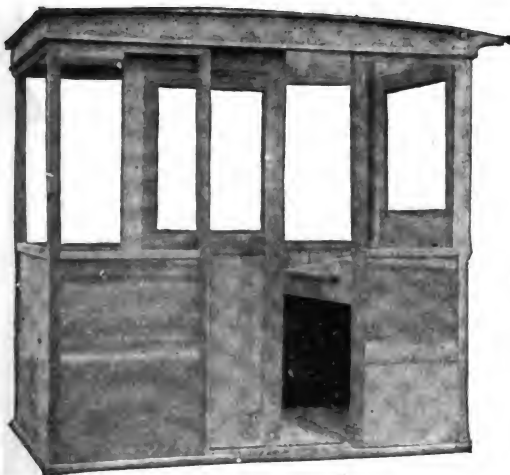


Fig. 718.

AN R.F.D. MAIL WAGON OUTFIT COMPLETE FOR \$25.50

This outfit we offer to meet that large demand our customers have for rural mail wagons! Every blacksmith should be in position to supply the goods, but in most cases he has been obliged to say, "I don't know where to get them." We have embodied in this outfit a strictly high-class rural mail wagon, body 30 by 55 inches on the bottom outside, a special end spring gear, made purposely for this mail wagon, a pair of the best selected XXX hickory shafts and a set of tired Sarven wheels, any height you may desire. Our special combination offer price is \$25.50 for this outfit complete. These goods are furnished in the white. The shafts and wheels, we ship right from here; the body and gear go direct from the factory.

In case you want axle boxes set in the wheels, add \$1.20; 75 cents for setting and 45 cents to cover express charges on the boxes from the factory to us. Should you prefer a body 34 by 66 inches we can furnish this size also at an additional cost of \$1.00. This is a first-class outfit in every particular. The rural mail wagon body is made in the best possible manner; note description accompanying cut.

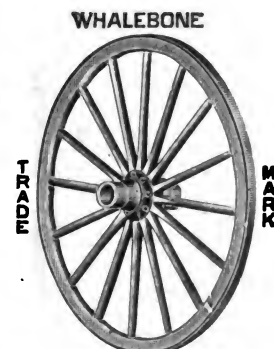


RURAL MAIL WAGON BODY—Description.

The regular size body is 30 by 55 inches, measuring on the bottom outside. The panels are made of white wood or poplar, which is the best material that can be used for this purpose. White ash is used for both doors and transoms. The posts are of red beech, which we have found to be the only kind of timber that will keep straight and stand the strain to which this part of the body is subjected; consequently, these bodies are very strong and substantial. With each body is included a mail box with suitable pigeon holes, but the iron, glass, curtains or covering for the roof, we do not include. You can supply these accessories more cheaply yourself. The body is constructed to knock down and is fully crated when shipped, so as to secure lowest freight rates. When the job is set up, however, it would not be detected that it was knocked down, for there are no painted joints to show where the job was taken apart and assembled again. All material used is first-class and the material, as well as the workmanship, is guaranteed in every respect. See price below.

The gear is constructed on the finest principles throughout and is especially adapted for mail wagon purposes. The shafts are best XXX hickory stock that can be purchased, and the wheels are the well-known "Whalebone" brand which are not to be equalled on the market. **OUR SPECIAL COMBINATION PRICE OF \$25.50** is an exceedingly low one for so fine and complete an outfit, and, as it is the time to purchase now, take advantage of this most liberal offer. If you are not over-rushed in your shop now and want to make a good investment, buy this outfit, finish it up and you will find a ready market for it.

For the benefit of those who may not need a complete outfit, but who desire only body, gear, wheels or shafts, we have itemized below the prices on the articles, separately, which represent our regular prices on these goods, and which you will find rock bottom. In totalling same, you will see the amount is \$27.39. When you buy this outfit complete, you save the difference of \$1.89. "A penny saved is a penny earned." Prompt shipments on the complete outfit or any of the articles, if ordered separately, we guarantee. Furthermore, we guarantee the material and workmanship of each article to be of the highest order. Anything that is not entirely satisfactory you are privileged to return at our expense. This is a most liberal offer, and we want you to take advantage of it. Do it now.



**WHALEBONE BRAND
IMPERIAL WHEEL COMPANY**

WHEELS.

For this combination offer, we supply a set of $\frac{3}{4}$ -inch by $\frac{3}{4}$ -inch tired C. Sarven wheels, 1 x 16-inch spoke; usual height, 3 feet 4 inches and 3 feet 8 inches. Other heights, however, can be had, with no additional cost. Write us whenever in need of wheels. We carry only the well-known "Whalebone" brand, which are without equal on the market. Prices the lowest, when quality is considered.

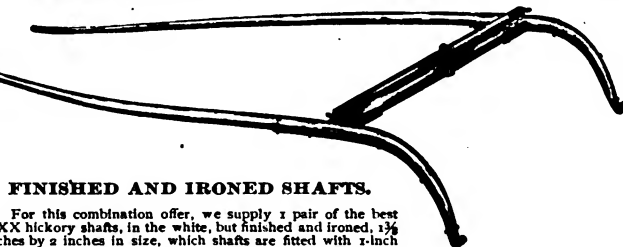
SPECIAL NOTE.

We are giving away **FREE**, an **AUTOMOBILE**, a **GASOLINE ENGINE**, also other **PRIZES** in cash; circular explaining in detail how you can win one of these prizes, will be gladly sent to you simply for the asking. These prizes are offered as a reward for business and do not affect our goods or prices in any way. Everyone has a fair chance to win and you are most cordially invited to try. While this contest was inaugurated Sept. 1st, don't think it too late too try, for at the first of the year we offered five additional prizes, for all of which you can compete with your orders until April 15th, the closing date of this most liberal prize offering. Every order counts toward winning. An order for this special rural mail wagon will count doubly strong. Some of our customers are bound to win, and there is no reason why every reader of **THE AMERICAN BLACKSMITH** should not try.



SPECIAL END SPRING GEAR FOR RURAL MAIL WAGON.

This gear is constructed on the finest mechanical principles, every piece or part thoroughly tested, and the workmanship is of the highest order. It is constructed as follows: 15-16-inch axles, $1\frac{1}{4}$ -inch by 4 leaf springs, wrought Derby fifth wheel, double reach, strongly braced, wood spring bars, as shown in cut. In ordering, be sure to state whether wide or narrow track. See price below.



FINISHED AND IRONED SHAFTS.

For this combination offer, we supply 1 pair of the best XXX hickory shafts, in the white, but finished and ironed, $1\frac{1}{2}$ inches by 2 inches in size, which shafts are fitted with 1-inch eyes, measuring about 3 feet 6 inches from centre to centre. Should you have need of other sizes of shafts or poles, we have a complete stock at right prices.

PRICES

Rural Mail Wagon Body, Size 30 in. x 55 in.....	\$9.50
Special End Spring Gear.....	8.55
$1\frac{1}{2}$ in. x 2 in. XXX Ironed Shafts.....	1.49
$\frac{3}{4}$ x $\frac{3}{4}$ in. Tired C Sarven Wheels.....	7.85
Total.....	\$27.39

Our Special Combination Offer Price for the Complete Outfit Above is \$25.50

OUR COMPLETE 1905 CATALOGUE

contains lowest prices on highest quality goods for everything used by the blacksmith or wagon maker. This new catalogue will be ready to mail early next month; however, don't delay writing for it, but get in line now, so as to receive one of the first copies. Our 1904 catalogue with revised prices will be sent to you now; the 1905 catalogue will follow as soon as ready. ISN'T IT WORTH A STAMP to know if we can save you money and all we can do for you? It will cost you only a postal card and a minute of your time to write for this book. If we cannot give you good goods, save you money or give you new ideas, then we know we are not entitled to your patronage, but if we can do all this, which we know we can, then aren't you willing to give us at least a trial? This is all we ask, for it will prove convincing from both your standpoint and ours.

Address Special Mail Wagon, Department C,

CRAY BROTHERS, Cleveland, Ohio.



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CAPEWELL HORSE NAILS

ARE THE LEADING NAILS OF THE
WORLD AND THE BEST.



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PLAIN PATTERN REGULAR HEAD.

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GENTLEMEN:—With my experience of many a year, I find the Capewell Horse Nail superior to any other on the market. The quality being good, it drives well, never breaks, and lasts long. In fact, I consider the Capewell Nail incomparably the very best, both for economical and practical purposes.

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President of the Miura Veterinary Hospital, Toshimo Macai,
Kanagawa Ken.

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Any blacksmith can successfully braze all broken castings in a few minutes, saving the expense of a new casting and the expensive delay of waiting for it.

THOUSANDS OF DOLLARS

are lost daily because of broken castings. The expense of replacing these castings is immense. Much money is lost because of machines lying idle waiting for broken parts to be replaced. You can prevent these large losses by

Mending Castings and make a big profit for yourself. For instance, suppose a gear wheel breaks. It may cost fifteen or twenty dollars for a new one, and the mill would have to lie idle for perhaps a week before the new one arrived. By means of a few cents' worth of **Brazit**, however, you can repair the wheel stronger than new and make as much **Brazit Will Do It.** It will successfully braze cast iron, braze cast money in an hour as you often make in days. iron to wrought iron, or weld steel to cast iron.

With Brazit you can successfully mend broken parts of machinery, agricultural implements, tools of all description, gears, windmills, pumps, engines, automobile parts, sewing machines, lawn mowers, pulleys, stoves, printing presses, and anything made of cast iron.

Our compound opens up a profitable line of work for every blacksmith. You invest practically nothing and the profits are big. You do not require special equipment, as the work is done in your forge. Wide-awake blacksmiths all over the country are taking up this work.

We want every blacksmith and repairman to try **Brazit**, because once they find out how easy it is to work, and what snug profits it makes, they will always keep a supply on hand.

In order to get you started with this profitable line of work we make the following liberal offer:—

We will send pre-paid a complete sample working set for

\$1.00

This set is sufficient to braze a large number of pieces. The directions are simple and complete.

REGULAR WORKING SETS--A complete outfit with plain directions, \$5.00

A trial of **Brazit** is the best way we know of for proving to you it will do as claimed. We want you to try it. You can do a big and profitable business mending all the broken castings in your neighborhood.

U. S. BRAZING COMPOUND COMPANY

113-115 SO. SECOND ST.

INCORPORATED.

NEW BEDFORD, MASS.

Read These Testimonials

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We acknowledge the receipt of your favor of March 4th, together with sample of "Brazit" which we have tried and found satisfactory.
POPE MANUFACTURING CO.

This is to certify that I have had a number of pieces of cast iron machinery mended with "Brazit" which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.

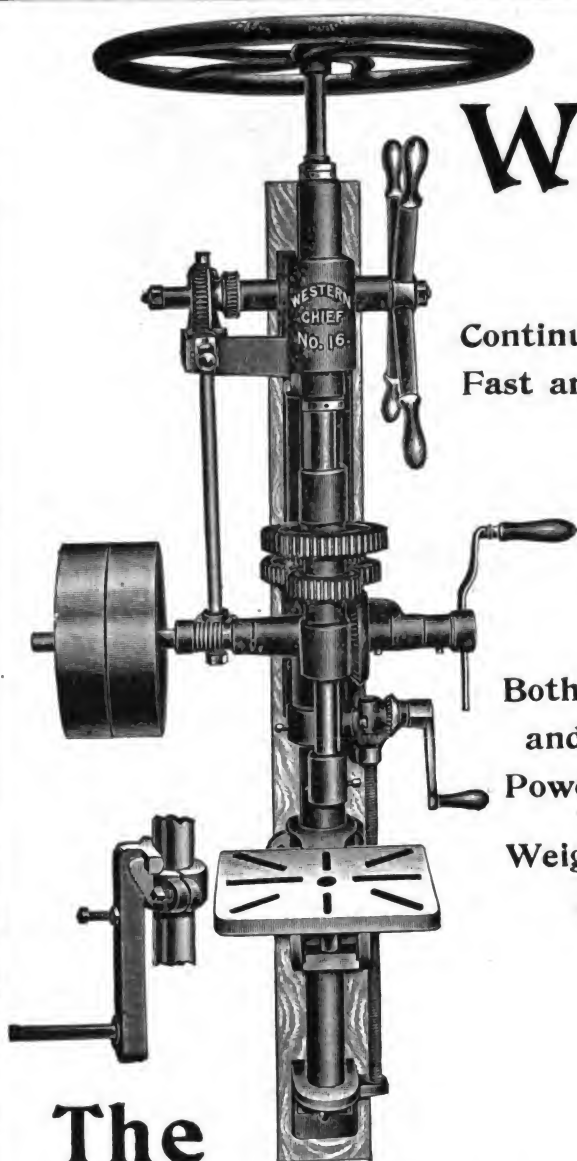
WILLARD N. LANE.

GREENSBORO, N. C.
Your compound just received O. K. Have tested it today on three pieces of cast iron with much success. I have used ——— made by the ——— Your **Brazit** is easier to work and does better brazing.

J. C. ALFORD.

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I have used your compound and it worked O. K. Wish I had had some of it before.
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Continuous Screw Feed.
Fast and Slow Speed.

Hand Lever Feed.
All Gears are Cut.

Raise and Lower to Table.

Drills to center of 24-inch circle.

Bores 0 to 1½ in.

Spindle runs up and down 8½ inches.

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Both Hand
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The Royal Blower

is absolutely free from all spiral or worm gears, and has not a ball bearing in it. Spiral and worm gears are short lived, and ball bearings are not suited to such high speeds. Phosphor bronze is used for the lead gear and bearings; and steel for the pinions and shafts. It is the simplest, lightest running and surest worker of any Blower on this day's market.

FAN, 12 inches diameter.
FIRE POT, 9x11½ x 4, inside.





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The most convenient machine a smith could buy. Carefully constructed, easy to operate. Strong, Powerful, Durable. Requires no engine to run it.

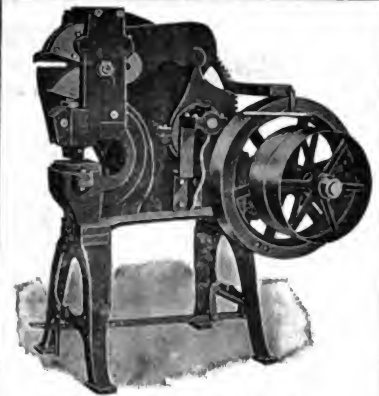
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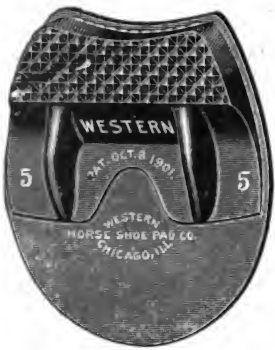
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First Rubber Company**

Sole Manufacturers
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The Perfect Power Hammer



Has no equal for simplicity and efficiency. Does a wide range of work, from the lightest forging to heavy axle welding. Has a direct vertical stroke. No side motion. No breakages and no repairs necessary. Made in three sizes. Write for attractive prices.

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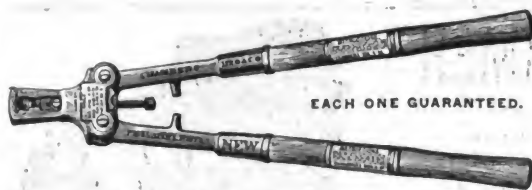
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WHAT? YES!

No. 15 THE BADGER No. 15

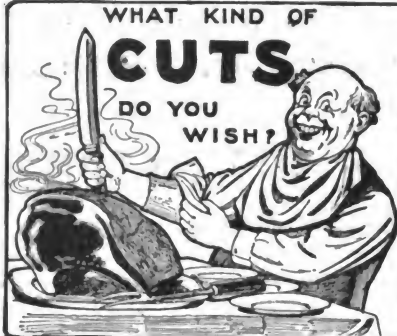
Will punch $\frac{3}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{3}{8}$ " by 4" flat iron.
Will shear $\frac{10}{16}$ " by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.



Weight 800 Lbs.

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Cures Kickers, Shyers, Bolters, Pullers and Runaways.

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100 lbs. on lever gives 25,000 lbs. pressure on punch. Always ready for work, and it does the business. Made in three sizes. No. 1 cuts iron $\frac{3}{4}$ " thick up to 8 inches wide and 1 inch round; it will punch $\frac{3}{8}$ " hole in $\frac{1}{2}$ " iron. Weight, 500 lbs. No. 2 cuts iron 6x $\frac{1}{2}$ " and 7x $\frac{1}{2}$ " round, punches $\frac{1}{2}$ " hole in $\frac{1}{2}$ " iron. Weight, 350 lbs. No. 3 cuts iron 6x $\frac{3}{4}$ " punches $\frac{1}{2}$ " hole in $\frac{1}{2}$ " iron. Weight, 250 lbs. Occupies a floor space when lever is up, 10x24 inches. It is simple in construction, there being only two pieces of casting in it. You can duplicate any part of it in your own blacksmith shop. We furnish with each machine five sets of punches and dies, any size, from 3-16 to $\frac{1}{4}$ ". There are two lower shears, one for round and one for flat iron. You will find use for it every day.

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We are pioneers in the manufacture
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We are the originators of the only
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We have no second-grade tire.
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American Blacksmith, Feb.

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Manufactured by **THE COLUMBUS FORGE & IRON CO.,** Columbus, O.

Sole Sale Agent **HERMANN BOKER & COMPANY,**
101 Duane Street, New York City.

AN AXLE

*Which is coming into favor
again is here illustrated, the*



**Stivers —
Long Swell**

We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

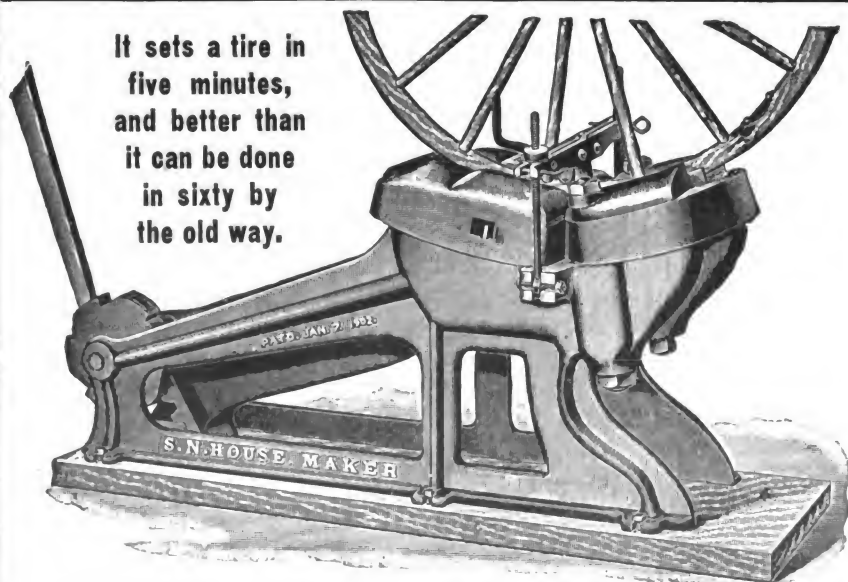
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THE HOUSE COLD TIRE SETTER

It sets a tire in
five minutes,
and better than
it can be done
in sixty by
the old way.



won the highest prize at the great World's Fair, but it has won a greater victory in the field. There are more of them in practical use today than of all other cold tire setters put together, and they are in use in every State in the Union. Ask your neighbor about it or write for catalogue.

Read what these two men say. We have a thousand more customers just as well pleased as these.

W. C. GUNLOCK, Victoria, Texas, says, after having used the House Cold Tire Setter for four years and set several thousand tires with it, that "it will do everything claimed for it and more, too. From four to seven minutes is all the time it takes to set a tire."

S. D. HAFLEY, Spring Creek, Pa., says: "The House Cold Tire Setter is all right. It has drawn me trade for ten miles, past three other shops. It is a sure trade winner. As long as I remain in the business I do not want to be without one, for it makes the hardest hottest work I had the easiest. The best record for speed I have made is two tires in three minutes."

HOUSE COLD TIRE SETTER COMPANY

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BY A. LUNGWITZ

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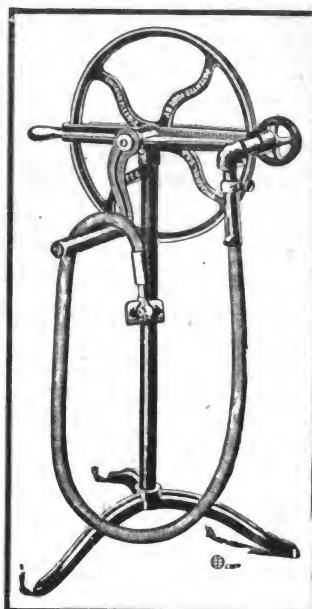
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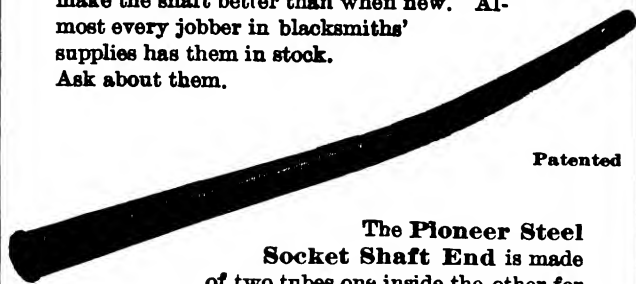
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Making of
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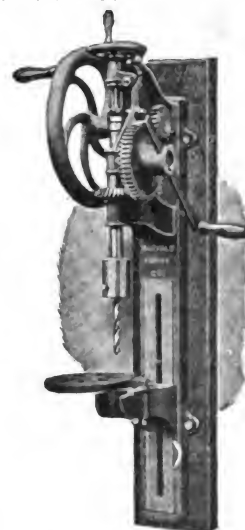
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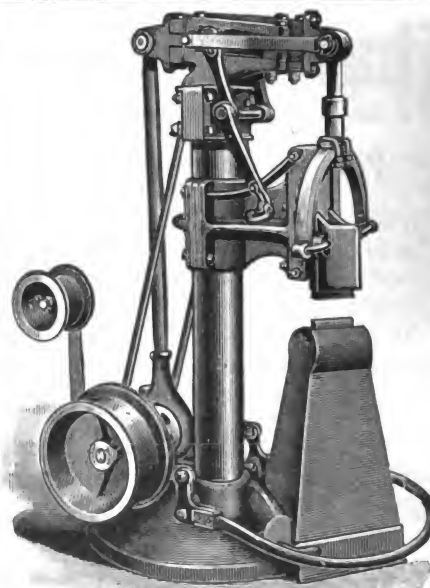
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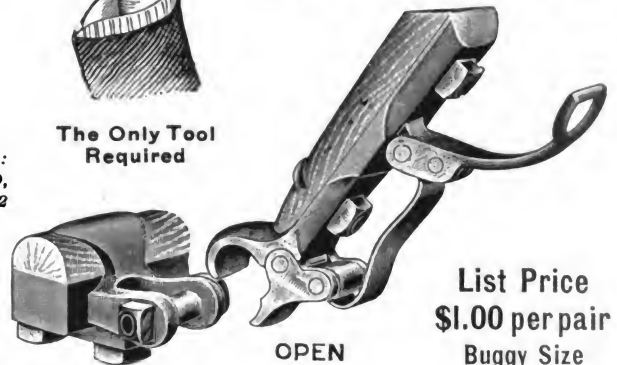
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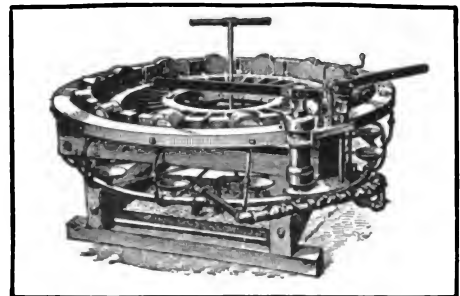
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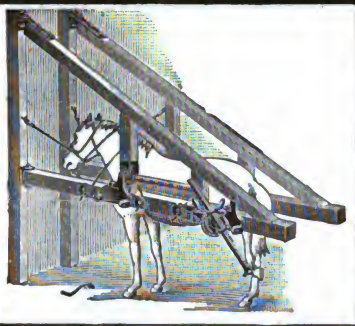


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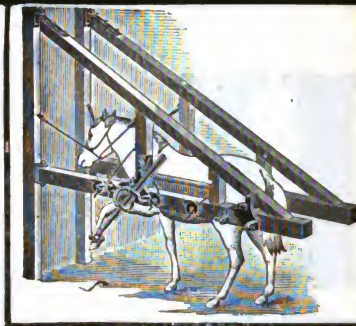
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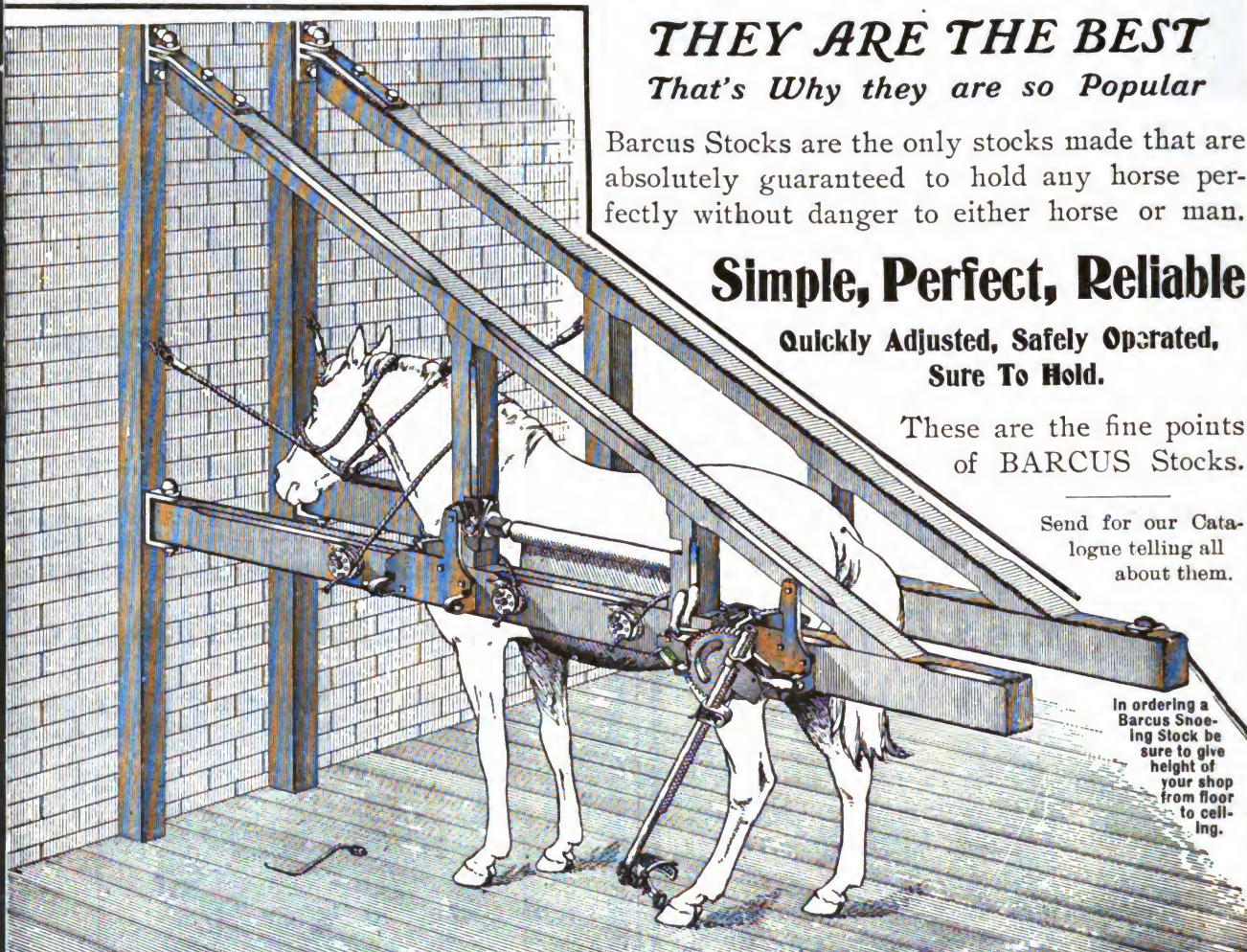
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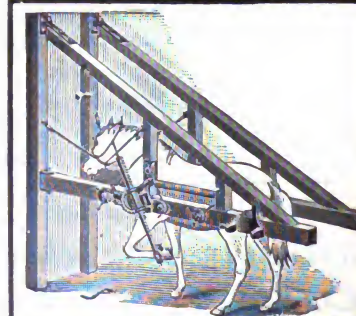
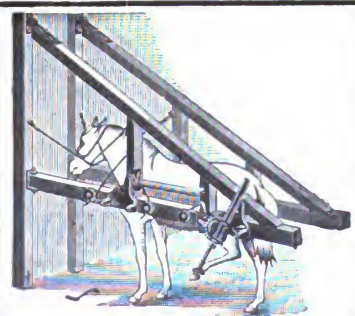
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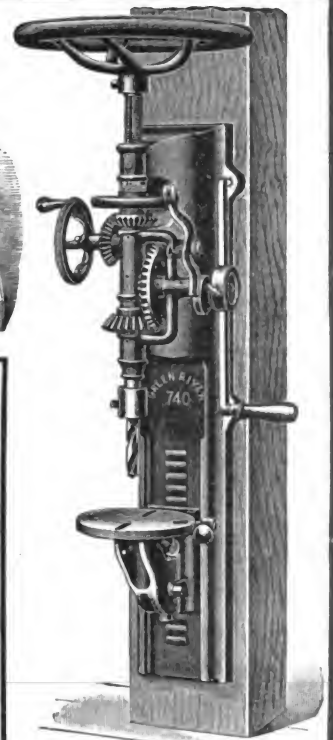
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Fig. 740

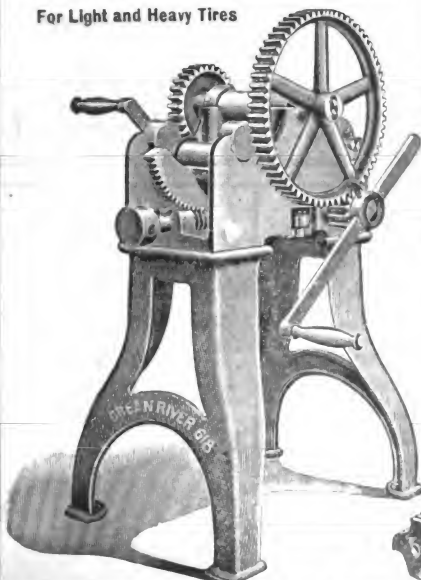
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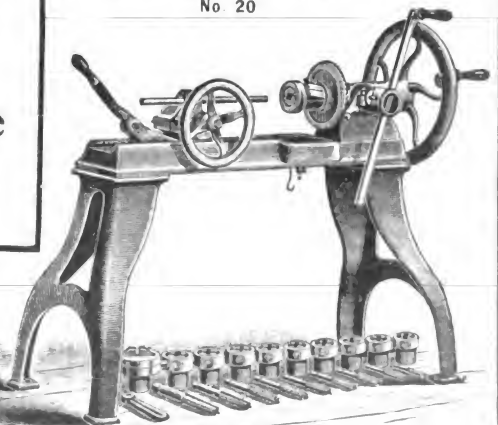
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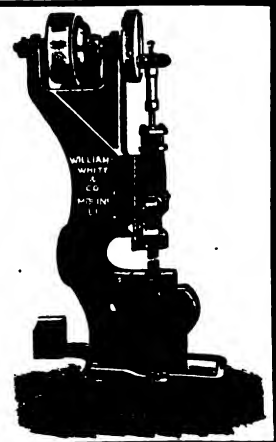
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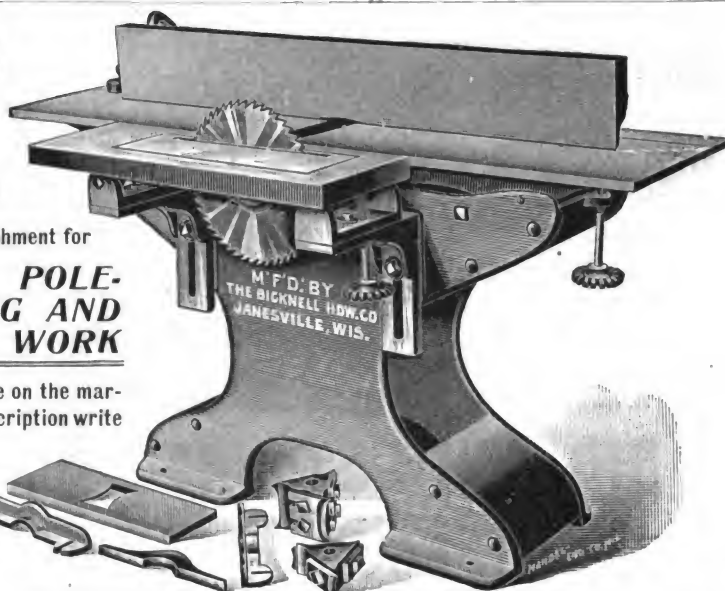
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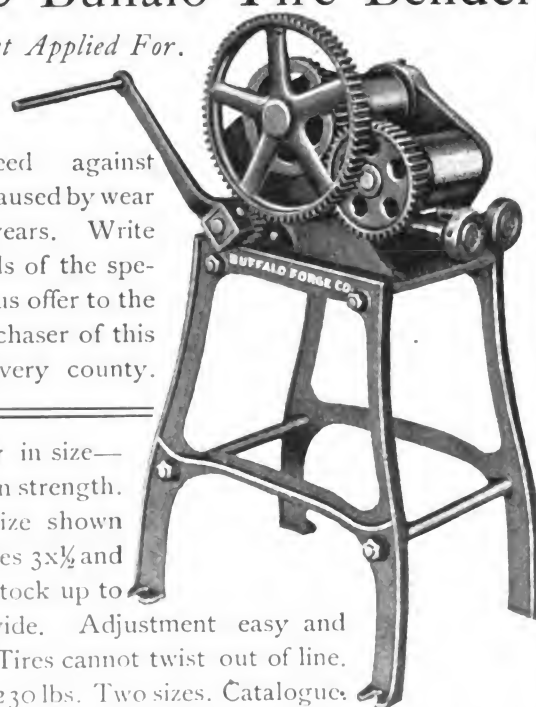
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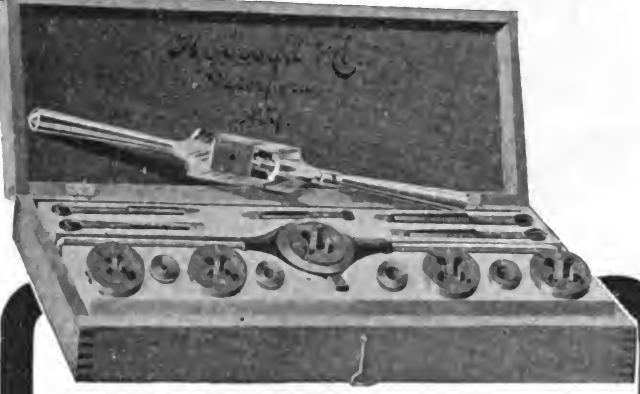
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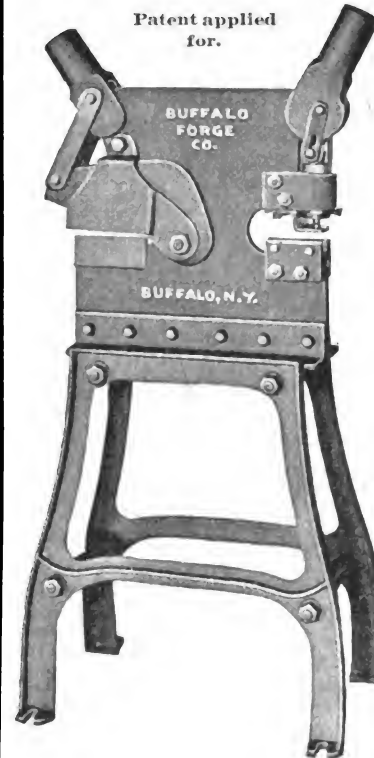
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1905 Buffalo Tire Upsetter

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136 Page Catalogue for the Asking.

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

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About New Subscribers.

The manager of the subscription department has requested a bit of space here to remind readers about two previous announcements. First, to ask each subscriber of THE AMERICAN BLACKSMITH to get just one other new blacksmith reader for the paper, and to receive, in reward, six months' credit upon his own subscription account. Hundreds have already taken advantage of this offer—more will do so, once it is brought to their attention. Secondly, to request the names of all who desire to compete for one of the ten cash prizes of \$5.00 each, offered to the ten persons sending in the greatest number of new readers before May 1st. Full particulars regarding the above may be had upon application.

The January American Blacksmith.

A few words about the big January issue of THE AMERICAN BLACKSMITH may be of interest. In point of circulation and the number of interesting pages, reading and advertising together, it was the largest edition ever published of any paper devoted to blacksmiths and wagon makers. Fifty thousand copies of 84 pages each were issued; concern-

ing them the following interesting facts have been figured out: Piled one on top of the other they would form a column five feet higher than the Washington monument, or 560 feet in all. Laid end to end, they would form a string quite $9\frac{1}{4}$ miles long. The total weight of the 50,000 papers was $15\frac{1}{2}$ tons, requiring three freight cars to transport them.

The publishers take this opportunity of thanking their many friends and readers for their generous patronage which has made possible the large measure of success that followed the introduction of THE AMERICAN BLACKSMITH. Our large and constantly growing list of readers, by their loyal and active support, have proved that there was a need and demand for a high-grade, practical, shop-information journal of blacksmithing. It shall be the aim always to merit this support, and to make the pages as valuable as can be to all smith-shop readers. Suggestions to this end will be gladly received at all times by the publishers.

What Is Your Side Line?

Every smith should have a side line of some kind, be it ever so unimportant. First of all, most men can do finer work if they have an occasional diversion, a hobby, as it is often termed, and if it be of a paying nature, so much the better. One smith we know of in York State has an incubator in his wood-shop, deriving no small interest and profit from his chicks. But the side lines we wish to advocate are those which can be made to grow till they yield a handsome independent income. Many a smith in farming communities has started in to handle implements on a small scale, and built up a good trade in them. A live smith is never satisfied unless his income is larger year by year, and side lines offer many an inducement for the craftsman whose eye is keen to note his opportunities and the openings in his neighborhood. Agricultural implements, harvesting machinery, wind mills, wire fencing and farm wagons, among other things, seem profitable lines for the

smith to handle, depending, of course, upon his locality. Oftentimes the smith is the very best man of all others to handle such trade, and many opportunities present themselves for securing such business right in connection with his shop work.

Write to manufacturers for particulars about agencies. If you do not know of any firms who make goods that you believe you could handle and sell, drop a line to THE AMERICAN BLACKSMITH. We can give you the address of reputable firms making almost anything. No charge for this, of course—we are glad to be of service in getting any of our readers started on the high road to larger profits.

Height of Wagon Wheels and Width of Tracks.

M. W. McCULLOUGH, SEC'Y., N. W. M. A.

The National Wagon Manufacturers' Association of the United States of America, a mutual organization of farm wagon manufacturers of twenty years' standing, has been planning a work of the utmost value not only to its members, but to the jobber and consumer as well.

Prior to 1898 the organization was largely of a social character, its members meeting once or twice a year to talk over the condition of the business in this line and to make helpful suggestions, but since that time there has been a movement on foot to make the Association of more practical benefit and this movement has progressed until they are now organized with a large working committee and permanent secretary who devotes his entire time to carrying out any work that may be undertaken by the association.

The general aim at the present time, briefly stated, is the standardizing of the various parts of wagons, which now differ greatly, but for which difference no practical reason can be given.

One of the greatest problems the manufacturer has to contend with in seeking to please his trade is the large and constantly increasing demand for

variations from his standard patterns, and in listening perhaps too much to those whose interest goes little beyond the selling of goods, he has consented to make changes that add practically nothing to the general utility of the article, but which do greatly increase the cost to produce, for with the increase in variety goes usually a reduction in the quantity of each kind. Not a little of the advance, which manufacturers have been compelled to add to their prices from time to time, has been brought about by just such really unnecessary changes.

A recent investigation was made to ascertain how many different heights of wheels were being furnished, and it was found that in Illinois, where uniform standards could be as easily maintained as anywhere, ten manufacturers

different in height, so that in point of strength or draft no advantage can be claimed one over the other.

It has been found by careful investigation that it is practicable to reduce this mass of varying heights to uniform standards that will not only satisfy every reasonable demand for convenience, draft, and strength, but which will in time add very materially to economy of manufacture.

The heights suggested, that will in the majority of cases, permit the manufacturers to utilize their present stocks of materials, are:

	Front	Rear
High or standard wheels....	44 in.	52 in.
Medium ".....	40 in.	48 in.
Low ".....	36 in.	44 in.

These three heights are practicable for use everywhere in this country and also permit the use of the same gears, the bolsters being properly leveled up in using any of the three heights of wheels above indicated.

In considering the adoption of standard wheel heights it should be apparent what it will mean to the manufacturer in securing his wood materials for his wheels. It is impossible for the majority of manufacturers today to purchase their rims and felloes except by placing a special order at the mills and waiting for them, as on account of the large variety of heights, no manufacturer of materials feels disposed to pile up any quantity of this stock, but undoubtedly would be glad to do so if standards were established that would insure him a ready market.

The question of tire stock, also, is of importance, one manufacturer recently having stated that he was obliged to keep some sixty different widths, thicknesses and lengths of tires, and that it was a most difficult thing even with a reasonable stock of these sizes to take prompt care of the varying demands.

The advantages of the general adoption of these standards are therefore many. For the manufacturer it will mean less difficulty in securing his supply of materials, and the ability to purchase in large quantity because of his needing fewer kinds; economy in storage of rough and finished product, also enabling him to put through the factory a large quantity of each size, reducing the cost of manufacture. He will also be able to carry a larger quantity of each kind, finished to promptly fill orders.

To the jobber and dealer the advantages of these established standards are obvious. No advantage is gained in

making sales because of the wheels being of an odd height, but many a dealer has suffered because his competitor would agree to furnish his customer almost any height of wheel he might fancy, thus compelling him to carry special sizes he would not otherwise have done and to provide storage for odd stock, the carrying of which was really unnecessary.

Co-operation with the manufacturers therefore will enable the dealer to say to his trade that certain standards have been established and the same heights will be kept in stock by all dealers, but if a customer wants a special wagon built, it can be made for him at the increase of cost over the standard wagon.

Then also the matter of delays in getting wagons promptly from the



A HANDSOME EFFECT IN ARTISTIC SCROLLS.

reported furnishing this trade twenty-one different heights of wheels. In Ohio eight manufacturers reported furnishing fifteen different heights, Missouri received sixteen heights from twelve factories, California seventeen heights from nine factories, Arkansas twenty heights from twelve factories and South Carolina thirteen heights from eight factories.

When it is considered that this data was gathered from only a limited number of factories doing business in those States, and also that each height of wheel is required in a number of sizes and with various widths of tire, the extent of this great variety can be faintly realized. Many of these wheel heights only vary one inch from others, while with some, the front wheels only are



A UNIQUE COMBINATION OF STRAIGHT BARS AND ARTISTIC CURVES.

manufacturers, especially during the season when the demand is very great, should not be overlooked, for every dealer has experienced waits of an unusual length of time for shipments, simply because perhaps one or two wagons in a car load were out of the ordinary, and sometimes the sale of most of the wagons in the car has been lost because of the delay thus occasioned.

In establishing the standards suggested the manufacturers are using their experience of over a half century in determining from a practical standpoint what heights will best serve the actual needs of the trade, there being no desire to urge arbitrary standards solely for convenience of manufacture.

Steps are also being taken to abolish odd and unnecessary widths of track,

and to adhere strictly to the standard or narrow track, 4 feet 6 inches from center to center of tires, and the wide track, which measures 5 feet.

Concerning the question as to how the consumer will look upon these changes, certainly after it is understood that these standards have been adopted universally, it will be seen that no one will profit to a greater extent than he. In standardizing the essential parts of a wagon the problem of securing repairs readily is solved and a saving of time and money apparent.

The minimum cost in any manufacturing establishment is dependent not only upon the arrangement of the plant and equipment, but on the uniformity and quantity of the product. Hence in order that both the manufacturer and his dealer may share in reduced cost of production it is necessary that

basis. But it was of no avail; they said they would not join and declared they liked to work and that they had no trouble in collecting their accounts by giving a liberal discount and taking potatoes at twenty cents above the market price. Finding that no one would join me I organized myself and raised my prices to about the same rate that a laborer gets on railroad work. Of course, my customers kicked and some of them left, but after all I found that I could make more money under the new system than under the old. I bought a few extra tools so as to be able to do work that the other smiths could not do. I found I could get a fair price for this class of work, so I continued to put in extra tools whenever I could, until now I have over three thousand dollars' worth of tools and machinery in my shop and I do a class of work that

bruster Brothers of Frankfort and are executed entirely in wrought iron. They show some exceptionally pleasing effects in scroll and straight bar work. These gates are located in the city hall building of Frankfort, Germany.

Industrial Training at Hampton Institute.

FRANK K. ROGERS.

Hampton Institute has been an industrial school from its beginning in 1868. It is industrial in the sense that young men and women can help to defray their living expenses by work, and also in the opportunity which it affords for the learning of a trade, or some other useful art.

The school was founded soon after the war by General S. C. Armstrong, for the education of negroes. It is largely supported by charitable contributions and is not a State or government school.



THE WATER FRONT AT HAMPTON INSTITUTE, SHOWING HOW BEAUTIFULLY THE SCHOOL IS SITUATED.

they co-operate in bringing back to practical standards those parts of any line of goods that have been changed to meet the whims of trade who wanted them just a little different.

Trade Conditions in Nova Scotia.

R. SUTHERLAND.

The blacksmiths in this locality persist in doing more work for a dollar than any other workmen, skilled or unskilled. He takes a special delight in doing three dollars' worth of work for one dollar. He puts on a new set of shoes for eighty cents, and if he finds he can make more than a living at that, he puts two or three extra kinks in the shoe to give himself more work.

But this is not the worst. He does all the little repair work, such as putting links and hooks in chains, a few bolts in a wagon or ironing a set of bob sleds, gratis, or for scarcely enough to pay the expense of doing the work.

Several years ago I tried to organize the smiths of this locality and to get them to put their business on a cash

does not bring me into competition with the man who works for nothing.

Ornamental Iron Work in Germany.

Probably in no other country on the globe has ornamental iron work been accorded the attention which it has received in Germany and probably in no other country has the art reached so high a stage of development. We find the German iron workers, as early as the thirteenth century, making their ponderous hinges in rather pleasing designs.

In Germany, unlike other countries, the art smith's craft has developed almost continuously since the thirteenth century. In France, Spain, England and Italy, while the iron industries were at times in full swing, they suffered much inactivity, often verging upon extinction.

The ornamental iron work pictured on page 82 this month includes some handsome examples of wrought iron works as executed in Germany. The doors are from the works of Arm-

In the early days, the boys carried on the farm work and helped erect the buildings, while the girls did the cooking, sewing and laundering, all going to school part of the time. As the school grew, other industries became necessary, such as wheelwrighting, blacksmithing, painting, etc., and young men were allowed to enter these classes as apprentices, spending all day in the shop and attending school at night.

This plan seemed so well fitted to the needs of the negro, and there grew up such a demand for trades, that in 1896, Dr. Frissell, the present principal, decided to group all trades which had sprung up on the place into one building, and provide a plan by which more systematic and thorough drill could be given than was possible under the original plan of the schools.

In the early days the boys practically learned their trade by doing such work as came into the shop, while under the new plan they are required to practice on exercises which are arranged systematically, and which embody the

principal elements of their trades, combined with a large amount of practical work for the school, or for outsiders. Thus, in blacksmithing, the course of exercises is as follows:

Instruction is given in the care of fire, the best fuels, proper heat; care and use of the general blacksmith's tools, including the working of the following processes: Drawing out, upsetting, bending, twisting, punching, cutting off, squaring up, scarfing, welding, brazing, case-hardening, tempering, annealing, heading and threading bolts, making and tapping nuts, riveting, hack-sawing, tire setting. These processes receive further application in the following:

paring foot to receive new shoe, and nailing in place; making shoes from horseshoe iron, and special shoes to overcome difficulties of the feet; study of diseases of the feet and the remedies which can be supplied by good shoeing; shoeing to overcome difficulties in the gait, such as interfering, etc.

The equipment in the blacksmith shop consists of twelve Buffalo hand and nine brick (power blasts) forges, a Buffalo down-draft exhaust smoke system, as installed by the Buffalo Forge Co. of Buffalo, N. Y., power punch and shear, bulldozer and three power drills. A small steam, or power hammer and a new punch or shear are much needed,

shop they are well fitted for life. Of the students who have finished blacksmithing since the trade school was established in 1896, 77% are either teaching their trade in other industrial schools which are springing up in the South, or are working as journeymen

In 1878 Hampton Institute was opened to Indians, who came largely from the Western reservations, and many of the Indian boys receive instruction in blacksmithing, some of them taking the full course. They make very good, skilled workers, and seem in many ways well adapted to the trades, but one naturally wonders if the Indian can stick to anything as long as it takes to



A BUSY CORNER OF THE WHEELWRIGHTING SHOP AT HAMPTON INSTITUTE.

Forging staples, gate hooks, hasps, anchors, cleats, hammers, eyebolts, collars, chains, punches, wheel tires, springs, general carriage work, lathe tools and horseshoeing. Work is done from drawings as far as possible.

Lectures on such topics as combustion of fuels, construction of metals, strength of materials, tempering and annealing, arrangement and equipment of shops, power forging, tracking of wheels, artistic forging, specifications and estimates.

In addition to the above a department of scientific horseshoeing has been added and each student, before he can finish his trade, takes his turn at this work. The course in horseshoeing covers the following ground: Stripping and pre-

paring foot to receive new shoe, and nailing in place.

Until he has reached a certain stage of proficiency, the student is drilled under the care of a competent instructor. As far as possible, the exercises are designed so that the result will be a useful article, or part of some unit. He also spends six hours a week at mechanical drawing, where he is taught to make drawings of such things as he is required to make in the shop.

As the larger part of the young men live in the country, and smaller towns and cities, most attention is given to horseshoeing and to carriage and wagon blacksmithing. A drill in wheelwrighting is also given, so that for the ordinary

learn blacksmithing. That many do so, however, shows that it is possible, and it is interesting to think that Ben Blackhawk and Joe Medicine Crow, who might today have been roaming the wilds hunting and fishing, are, instead, toiling over a smoky forge, learning the white man's way to shoe a horse or make a wagon. There are now at Hampton Institute about 100 Indians, 53 boys and 47 girls.

The other trades taught are: Painting, carpentry, harness-making, shoemaking, wheelwrighting, machine work, brick-laying and plastering, woodturning, tinsmithing, steamfitting and plumbing, tailoring, printing and upholstering. The plan followed in all these trades is

similar to that in blacksmithing, and is intended to fit boys to be general mechanics and teachers in the shops of industrial schools. In addition to careful training along a special line, enough of allied trades is given to provide that sort of foundation which makes all-around men. Thus, carpenters are given some drill in bricklaying, plastering, woodturning, painting and tinsmithing; wheelwrights in blacksmithing and painting; blacksmiths in wheelwrighting.

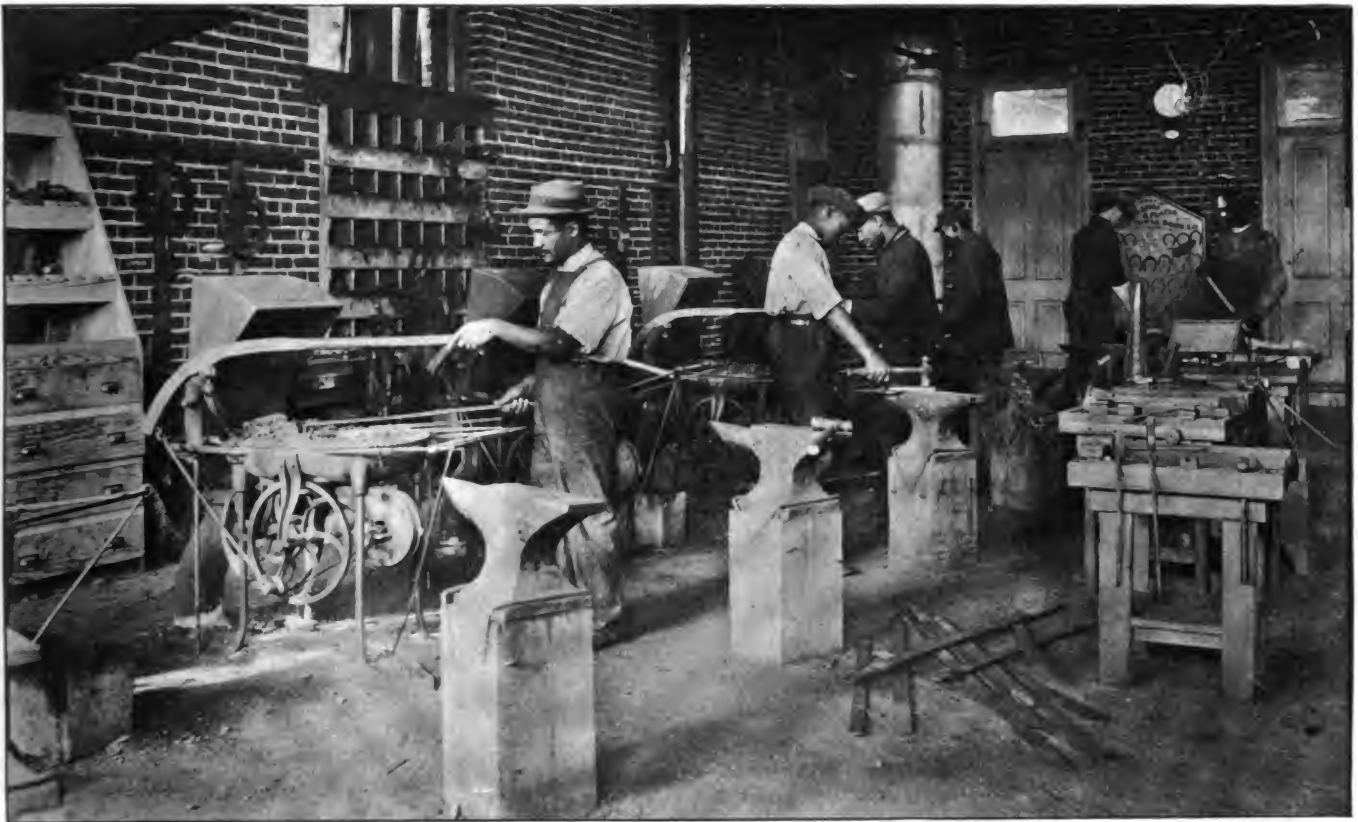
Agriculture is one of the principal features of Hampton Institute, and while all students receive some instruction in this subject; those who wish to

training, and it was the belief of the founder that Christian men and women of these races, trained as teachers and mechanics, would do more to elevate their people than any others could do. With this in mind, only those who are strongest mentally, morally, and physically are admitted, preference being given to those who come from country districts of the South. Many graduates of the school are doing noble work, the most notable of which is that of Mr. Booker T. Washington, of the schools at Tuskegee, Alabama.

A description of the Tuskegee Institute accompanied by pictures of the

engine no such attention is necessary and consequently its care is comparatively easy. While this is true, it needs regular attention of the right kind and for this reason it should be handled as much as possible by one person. He should be held responsible for the successful operation of it. If he is a good engineer no one else needs to bother with it except possibly to give assistance in starting if it is a large engine.

To care for an engine properly, an engineer must learn the function of every working part of his engine. He must know when the receiving valve should open and when it should close in



INTERIOR OF THE BLACKSMITH SHOP AT HAMPTON INSTITUTE, SHOWING THE VERY COMPLETE EQUIPMENT.

become trained farmers or teachers of agriculture, may take a three years' course similar to the trade courses.

There are about 750 acres of land, which provides ample farming experience for agricultural students and labor for others. All money earned by students in any department is placed to their credit at the treasurer's office, and the board and clothing and other incidentals charged to them. No student is allowed to get into debt to the school and if his parents cannot assist him he must either work to acquire a balance, or leave school. The student receives board, room, washing, lights, baths and heat for \$10.00 per month.

Hampton stands strongly for religious

students at work, and also of the buildings, appeared in the AMERICAN BLACKSMITH of last year.

The Gas Engine.—6.

E. W. LONGNECKER.

Care of the Engine.

No one having charge of a gas engine can care for it properly unless he has a deep concern for the successful running of it. A lazy man and a gas engine will not get along well together. The neglected engine is constantly giving trouble and will be worn out long before its time. The gas engine needs but little attention when compared with the steam engine. The constant firing and supplying of water in the steam engine require constant attention. In the gas

relation to the movement of the piston The same of the exhaust valve. Also the point in the piston movement at which the igniter points are separated and the spark made. He can get familiar with these points when the engine is new by turning it over slowly and by noticing that the receiving valve opens at the beginning of the outward stroke of the piston and closes at the end of this stroke. Just before the end of the following inward stroke he will notice the sparker snap which separates the points and breaks the current at which instant the spark is made. By continuing the turning process he will watch for the opening and closing points of the exhaust valve. He must fix in his mind

the points in the piston movement when these different acts occur so that he may be prepared to say at all times whether they work in harmony and at the proper time. When he knows this, he knows what mechanism performs the act and knows how to care for it. No engine can continue to work successfully for any length of time if the oiling of any of its wearing parts is neglected. Oil regularly and well all of the wearing parts. This obviates much wear and trouble later.

Plenty of water in the cooling tank at all times when the engine is in use and turned into the engine immediately after starting, is very necessary. Don't overlook this important part in caring for your engine. Much damage can be done to a cylinder by forgetting to turn the water on until the smoke rolls out of the

room regularly three times a week. Keep oil cans, wrenches and tools in a place prepared for them conveniently near to the engine. The drain valve of the engine cylinder should always be opened just previous to shutting down the engine, and the water from the supply tank turned off by closing the valve in the supply pipe. If you forget this in freezing weather, you will do serious damage to the engine.

The selection of lubricating oil for the gas engine is another point in the care of the engine. Any good grade of machine oil can and should be used on the various wearing parts of the engine, except in the cylinder and on the piston. Here a thin oil that will deposit no carbon under a high temperature, is the oil to be used to the exclusion of all others. If, however, the cylinder re-

and that bring other and permanent custom to the shop

Some years ago a neighbor brought to the shop a reaper with the cast iron rake standard, 2½ inches in diameter and solid, broken off short in the middle. His grain was ripe and wasting, and it was 800 miles to the factory where another could be gotten. Could it be fixed so he could go on cutting? Yes, if we had luck. The price was to be that of a new one if it held and did his cutting, and with a guarantee that it would hold until the machine wore out. If it did not do this cutting there would be no charge.

We burned and cleaned off the paint about five inches back from the break, and thoroughly washed the parts with a wire brush and borax water. We then took three pieces of ½ by 1½-inch iron 8 inches long, and hollowed one side to fit the round standard, bored ⅜-inch holes two inches from each end and bored and taped the standard, giving the pieces a little draw to bring the joint together. We then heated these pieces and screwed them on with cap screws, and put the piece in the fire, blocking it against strains, and then we brazed it. When we came back from supper, we cooled it off and found that the standard joint and the pieces and standard were solidly brazed together and stronger than ever.

The farmer was in the field when the sun came up the next morning, a happy man, and he made me happy with seven silver dollars and his thanks when he finished cutting. I gained his good-will and entire custom.

Five years after that I went to the pineries to start a saw mill. It was hurrying times and the help was there. The mill was to start the next morning, but it was found that a coupling to connect a 3-inch shaft 8 feet long to a 16-foot shaft of the same size was missing. The worry was well under way when I thought of the reaper shaft and said I could fix it. This was done in the same manner as the reaper shaft, only I made the pieces heavier, putting the long shaft in two of its boxes in the shop, one near the forge and on solid blocking, and one outside the shop for the short shaft and in line with the other two and the forge. When it was brazed a man was set to turn the shaft until it was nearly cold, the fire being drawn. In this case we were short of coal and the top fire was made of dry tamarack wood.

That winter a two-inch water pipe to the boiler burst by freezing; the pipe was taken to the shop and the burst pounded together. A table spoon was



SOME PRODUCTS OF HAMPTON INSTITUTE READY FOR SHIPMENT.

open end of the cylinder, and then excitedly turning on quickly a full volume of cold water. Under such conditions water should be turned in gradually, and the cylinder lubricator opened freely so that the heated condition of the cylinder may adjust itself to the proper temperature gradually. But it is best not to forget.

Above all keep the engine clean all over. A clean engine portrays a good and careful engineer, a successful running engine and a long-lived engine. Cleanliness does not mean simply rubbing up the bright parts on the engine, but keeping the entire outside of the engine clean as well as the inside of the cylinder, the piston, rings, valves, valve stems, sparking mechanism, and the entire room in which the engine is placed or located. Sweep your engine

receives its lubrication from the splash of an enclosed crank case, then it is best to call for a crank case oil, but at all times avoid the heavy, thick oil, sold for steam cylinder lubrication. Such oil churned up in the crank case, if any water is present, will form lumps and lose its lubricating quality.

(To be continued.)

Experiences In Brazing.

JOHN W.

A blacksmith must have good, up-to-date tools and methods, and he must be alert with his brain to keep up with the times and see that no job which comes to the shop and is worth fixing, either from its intrinsic value, or for the immediate want of it, goes away without fixing. It is the odd jobs that the other fellow thinks and says he can't or won't do, that are cheerfully and well paid for,

tied to the end of a rod, the center of the spoon was put to the break and a mark made on the rod at the end of the pipe. The spoon was then filled with borax and small pieces of brass and the pipe was put in the fire with the burst part down. When it was hot the spoon was emptied inside the pipe. The other end of the rod was bent short and with this the brass and flux were worked into the crack with success.

A thresher brought to me a shaker crank or arm which he had broken by driving the key too tight. I cleaned it off and bent a $\frac{1}{2}$ by 2-inch iron over the broken head, letting the ends extend up the arm about 8 inches. I bored four holes in the ends for a machine bolt each side of the arm, heated the bent iron, except at the ends, screwed up the nuts and tapped it to better shape as it cooled. Then I put on borax and brass and placed it in the fire. The job was not handsome, but it lasted until the machine went to the junkpile. There is always a way if one keeps his thinking-cap on straight.

Grocers' Light-Top Delivery Wagon—1.

J. LAWRENCE HILL.

The style of top shown is chosen out of many for its simplicity of construction, the timbers used in its construction, with the exception of the roof and toe board, being straight, the arch of these being very slight and easily cut with an ordinary rip saw. Plans for the making of the running gear will follow in an early number.

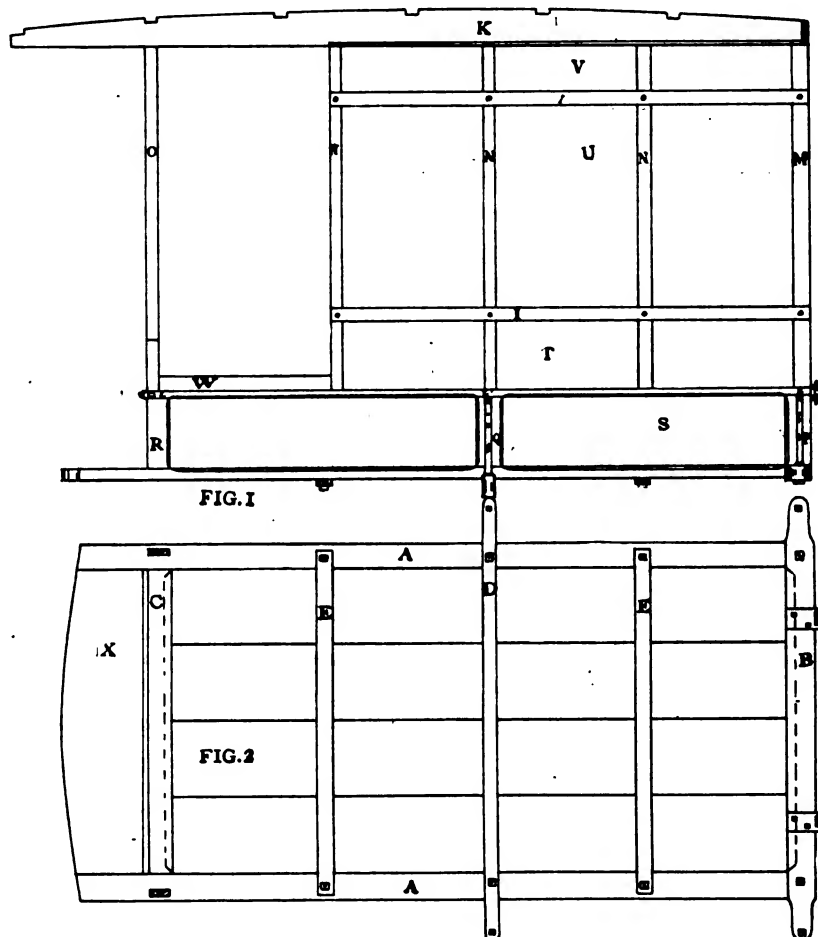
Fig. 1 shows the construction and frame work of the sides. This view will enable the builder to readily understand the construction of the top and save both time and material. The top rail K extends 11 $\frac{1}{2}$ inches in front of the forward pillar O. W is the only piece that connects the ends of the standards. This piece does the duty of a seat slide and, also, panel T, having no support at the top, stiffens this at the bottom. The space between O and N is 20 $\frac{1}{2}$ inches and from N to M is 57 $\frac{1}{2}$ inches. The height of the top (from T to K) is 45 $\frac{1}{2}$ inches. The height of the body or box (Fig. 6) being 10 $\frac{1}{2}$ inches makes the total height of wagon top from bottom of box to roof 55 $\frac{1}{2}$ inches. The top being entirely independent of the body allows for the wagon being used in two ways. The top is secured to the body by strap bolts, as shown on the right of Fig. 4, and by corner plates, as shown in Fig. 5.

Fig. 2 is the plan of the bottom of the body. From C to B it is 6 feet 8 inches

and from A to A it is 4 feet 6 $\frac{1}{2}$ inches, making the box 3 feet 4 inches on the inside. A is mortised into B and is flush on the top side. C is mortised into A and is shown in section in Fig. 6. The panel is fastened by screws to the sill and in like manner the top rail to the panel.

The dotted lines at C and B, Fig. 2, indicate the ends of the bottom boards. The cross bars C and B should be cut out along these lines to the thickness of the boards so as to have the top surface of the boards level with the top

is shown in Fig. 5. The cut-out at the bottom is for the panel and is $\frac{3}{4}$ of an inch deep by 6 inches long. The side view of the other pillars can be seen in Fig. 4. In this latter view the frame only is shown on the right hand side. This shows the cut-outs for the side slots as shown in Fig. 1. On the left hand side the panel is shown on the frame. Make the end of the panel slightly round, as this makes a good finish and if the joint between the panel and standard should crack through the paint, it is not as likely to show.



Figs. 1 and 2.—SHOWING PLANS OF SIDE AND BOTTOM OF LIGHT-TOP DELIVERY WAGON.

of the sills and bars. E E, Fig. 2, are bolted under the sill as shown in Fig. 6. D is also cut out like E, this method giving a good solid bearing for the bottom boards. The toe board X is cut on a bevel at the ends as shown at Fig. 5, and a 3 by $\frac{1}{2}$ -inch plate is screwed on top of the joint made by the toe board and sill. These plates keep the board and sills together and take up the wear.

Fig. 3 is the plan of the roof. K is a top view of K in Fig. 1 and shows how these pieces are cut so as to receive the standards and bows.

The side view of the front pillar O

Fig. 7 is the plan of the front corner pillar R. It requires a bit of hand work to get it out of a 2 $\frac{1}{2}$ -inch square block. But the time is well spent, for it makes a very strong and neat corner. The rabbet is for the panel to fit into. This pillar should be tenoned through the sill A and into C about $\frac{1}{2}$ inch. The back pillar P is stub tenoned into B and rabbeted out for the panel the same as Fig. 7.

Fig. 8 is a section of the moulding which is used to cover the panel joints. It can be very easily made by rounding over the edge of a $\frac{3}{4}$ -inch board and ripping off. Repeat this operation

until the required number of pieces are turned out.

Complete List of Wood and the Sizes Required.

In compiling these measurements the writer's desire is not so much to give the exact sizes (though each one can be relied upon to be correct), but to enable

Bows H, 5 pieces 1 by $\frac{3}{4}$ inches by 3 feet 7 inches, ash.

Side flats I, 4 pieces 1 by $\frac{1}{2}$ inches by 4 feet 10 inches, ash.

Top flats J, 15 pieces $1\frac{1}{2}$ by $\frac{3}{4}$ inches by 8 feet 1 inch, white wood.

Top side rails K, 2 pieces 4 by $\frac{3}{4}$ inches by 8 feet 1 inch, white wood.

Top body rails L, 2 pieces $1\frac{1}{2}$ by $\frac{3}{4}$ inches by 7 feet, ash.

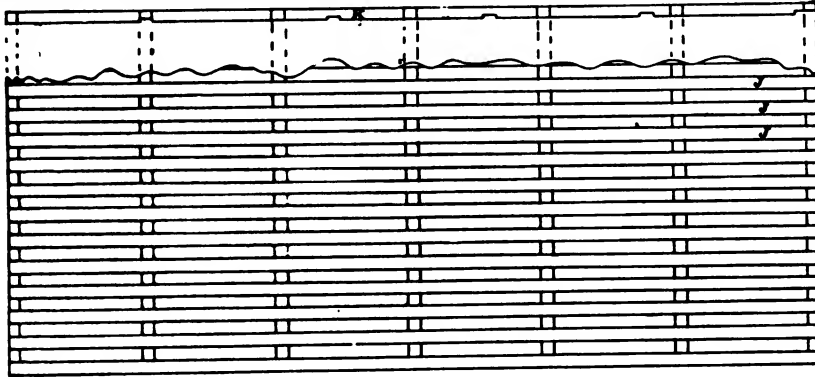


Fig. 3.—SHOWING THE PLAN OF THE ROOF OF THE WAGON TOP.

the country or repair blacksmith to form some idea of the cost of material, and what is required so as to have as little waste as possible.

In different sections of the country the wood used is different, for instance, on the Pacific Coast, spruce or sugar pine is used in place of our white wood, while in Canada bass wood takes its place. The strength of these timbers varies, but for this particular purpose the measurements given will answer for each kind.

Sill A, 2 pieces 3 by $1\frac{1}{2}$ inches by 4 feet 6 inches, ash.

Back Bar B, 1 piece 3 by $1\frac{1}{2}$ inches by 4 feet 6 inches, ash.

Front Bar C, 1 piece $2\frac{1}{2}$ by $1\frac{1}{2}$ inches by 3 feet 4 inches, ash.

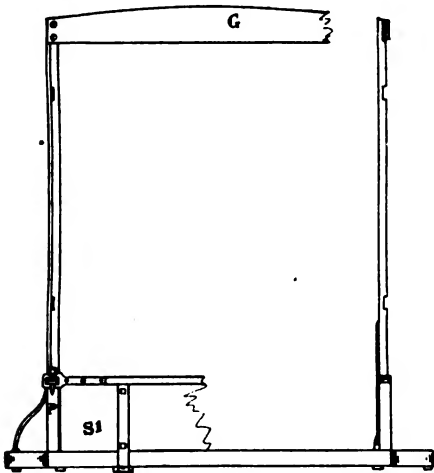


Fig. 4.—REAR END VIEW OF WAGON TOP.

Center Bar D, 1 piece $2\frac{1}{2}$ by $1\frac{1}{2}$ inches by 4 feet 6 inches, ash.

Cross Bar E, 2 pieces $1\frac{1}{2}$ by $1\frac{1}{2}$ inches by 3 feet 4 inches, ash.

Top front bar F, 1 piece $1\frac{1}{2}$ by $\frac{3}{4}$ inches by 3 feet 7 inches, white wood.

Top back bar G, 1 piece $4\frac{1}{2}$ by $\frac{3}{4}$ inches by 3 feet 7 inches, white wood.

Cross body rails, 2 pieces $1\frac{1}{2}$ by $\frac{3}{4}$ inches by 3 feet 9 inches, ash.

Back top standards M, 2 pieces 2 by $\frac{3}{4}$ inches by 3 feet 10 inches, ash.

Front top standard O, 2 pieces $1\frac{1}{2}$ by $1\frac{1}{2}$ inches by 3 feet 11 inches, ash.

Center top standard N, 6 pieces $1\frac{1}{2}$ by $\frac{3}{4}$ inches by 3 feet 11 inches, ash.

Body pillars P, 2 pieces 3 by $1\frac{1}{2}$ inches by 10 inches, ash.

Body pillars Q, 2 pieces 3 by $\frac{3}{4}$ inches by 10 inches, ash.

Body pillars R, 2 pieces $2\frac{1}{2}$ by $2\frac{1}{2}$ inches by 1 foot, ash.

Bottom Boards, 4 pieces 9 by $\frac{3}{4}$ inches by 6 feet 5 inches, white wood.

Panels S, 2 pieces $8\frac{1}{2}$ by $\frac{3}{4}$ inches by 6 feet 5 inches, white wood.

Panels S, 1, one piece $8\frac{1}{2}$ by 1 inch by 3 feet 4 inches, white wood.

Panels T, 2 pieces 10 by $\frac{3}{4}$ inches by 6 feet 9 inches, white wood.

Panels U, 2 pieces 26 by $\frac{3}{4}$ inches by 4 feet 10 inches, white wood.

Panels V, 2 pieces 7 by $\frac{3}{4}$ inches by 4 feet 10 inches, white wood.

Toe Board X, one piece 10 by $\frac{3}{4}$ inches by 3 feet 4 inches, white wood.

Seat Board, 1 piece 16 by $\frac{3}{4}$ inches by 3 feet 3 inches, white wood.

Seat back, 1 piece $4\frac{1}{2}$ by $\frac{3}{4}$ inches by 3 feet, white wood.

Moulding, Fig. 8, 6 pieces 4 feet 10 inches, white wood.

Moulding, Fig. 8, 2 pieces 3 feet 6 inches, white wood.

Moulding, Fig. 8, 2 pieces 3 feet, white wood.

Seat Slide W, 2 pieces $1\frac{1}{2}$ by $1\frac{1}{2}$ inches by 2 feet, ash.

(To be continued.)

How to Choke Bore a Shot Gun.

E. C. JOHNSON.

There are doubtless many of my brother smiths who at different times have been asked to make an old gun, and sometimes a new one, shoot closer. This is the way in which it is done. In the first place a good tool to do the job with is the auger made by J. W. Bacheller, of St. Joseph, Mo. Do not attempt to bore a barrel that is sprung, until it has been straightened. On double guns

this is a hard matter to do, as they are soldered or brazed to the rib and you are apt to spring the other barrel, so it is best not to attempt to bore such barrels. Put the barrels in a clamp made of wood and screw the clamp in the vice. Insert the tool in the breech and bore clean through with a light cut, being careful that the band is straight. Next screw the blades of the tool slightly open, take a light cut to within $\frac{1}{2}$ -inch of the muzzle, and so continue until the pits are all out. Keep the blades of the tool very sharp by rubbing on a fine oil stone and grinding only on the dull spots to keep the blades straight and to avoid ring boring. Now reverse the tool and, standing at the breech of the barrels, bore a recess four inches long and about $\frac{1}{4}$ -inch from the muzzle (the deeper the recess the closer the gun will shoot). Now take a half round file and smooth off the shoulder at the muzzle, so as to prevent powder cake. At this point you must use strong soap suds as a lubricator (never use oil, as it will tear the barrels), taking light cuts to smooth the barrel and using plenty of suds. Use the blade that cuts best and keep the blades very sharp. Have no niches in them, as that will scar the barrel. Turn the tool slowly and feed slowly, you will get as good results from a good, cheap gun bored this way as can be found in any of the highest grades. I have bored ten-gauge guns that patterned 85 with No. 4 shot in a 15-inch circle at fifty yards. Load 4 drs. powder, one and one-fourth shot. Avoid using smokeless powder in guns not made

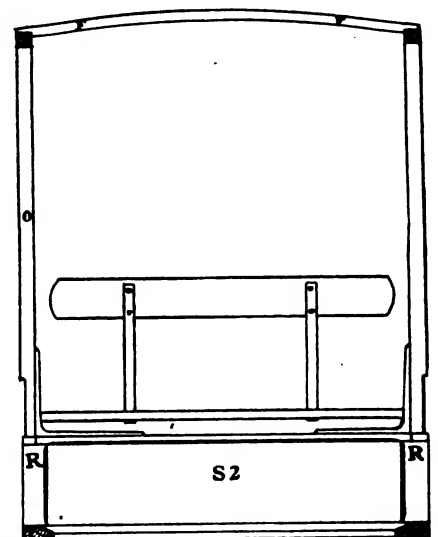


Fig. 5.—FRONT END VIEW OF WAGON TOP.

for it, as it develops tremendous pressure: 65,000 pounds to the square inch as against 15,000 pounds for black powder. Gun smithing is a fascinating

line of work, and I should like to hear from some other brothers about their experience with it.

The Welding of Springs.

L. VAN DORIN.

I would like to say a few words on welding carriage springs as given in

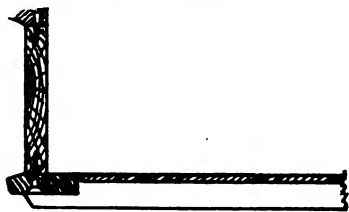


FIG. 6



FIG. 7

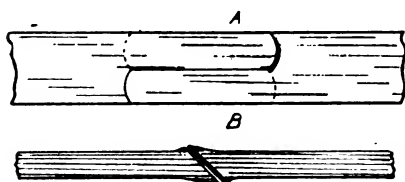


FIG. 8

Figs. 6, 7 and 8.—DETAILS OF CONSTRUCTION OF WAGON TOP.

Brother Anderson's article in the December number. He does it just as the writer did 40 years ago, but since the advent of Climax welding compound, we do it a quicker and better way.

First, we will try to show the evil of his method. All experienced smiths know the disadvantage in long lap welding. Mr. Anderson says he splits each of the scarfed ends $1\frac{1}{2}$ inches, which when locked together as he describes, will measure about three inches from tip to tip of scarfs. Then he condemns upsetting, and, of course, the heating and welding down of the points of the scarfs on the plate where it has not been thickened must reduce it at a point where nine chances out of ten it has been overheated, and where they invariably break. He says further that



THE WELDING OF SPRINGS.

he never knew one he has welded to break in the weld; they would be very foolish to break there when it can be done so much easier just at one side.

Hoping Brother Anderson will pardon my criticism, I will now tell how I do it. First I upset thoroughly each broken end to be united, then scarf as I would a piece of iron, except to be more particular in bringing the points of the

scarfs to a feather edge. All scarfs should be made with a heel that should just come under the point of opposite scarf, as shown at B. Then I bring to the traditional cherry heat, sprinkle welding compound on the face of each scarf, and lay them carefully in the fire, face side up, until they approach nearly a welding heat, when the compound will adhere to the steel. Then I turn face down for a moment and take from the fire, put the face of scarfs together and weld to the queen's taste. The weld should be thorough on the first heat, as it's dangerous taking a welding heat after putting together. The welding must be done quickly to prevent points of scarf from chilling on the anvil, then you can flatten and smooth up at leisure, leaving no lumps, but having it look just as it did before it broke. I have welded a great many springs as above described and have never heard of one breaking. If the spring plate can be lengthened by unrolling the end it will not be necessary to put in a piece; otherwise it will. Unless I have a reliable helper, I prefer working the first heat alone with a heavy hand hammer. Fig. A shows flat surface of Brother Anderson's lap. Fig. B shows edge view of lap made by myself.

A Device for Raising Wheels When Putting on Tire Bolts.

JAMES H. JENSON.

The tool is of my own invention and one that I wish to give to the craft. It is for raising and lowering carriage wheels when putting on or taking off burs or tire bolts, when drilling new tires and when reaming for bolt heads. Here I may as well mention a little tool I use in connection with my drilling machine. It is a piece of stock $1\frac{1}{2}$ by 4 by 3 feet with a half-inch hole drilled $1\frac{1}{2}$ inches from the end. With this I can drill holes through thin stuff or countersink two holes while I can drill one with screw or self feed.

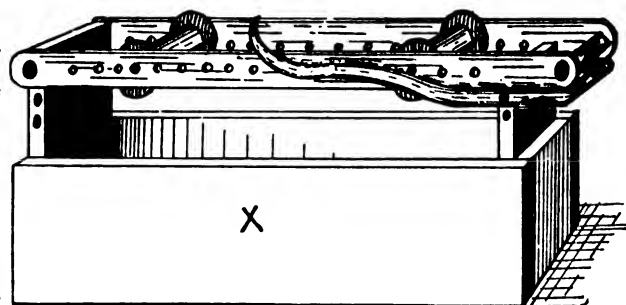
The parts of the wheel raising device are as follows: The part marked X is the box which is sunk into the ground below the drill press. This is 5 by 8 by 3 feet 6 inches. The upright at the left makes one end of the box and is hinged to the bridge. The other end fits into the box and can be easily lifted out. The bridge is made of two pieces of soft

steel stock each 2 by $\frac{3}{4}$ by 4 feet 4 inches. Holes are punched into each piece so as to accommodate different sizes of wheels. The rollers for the bridge are made of two pieces of 3-inch pipe, 3 inches long. These pieces are driven full of hard wood. The four flanges for the rollers are $4\frac{1}{2}$ inches in diameter and are riveted onto the ends of the pieces of pipe. A hole is now drilled through the center of these rollers and they are then placed on the bridge as you see them. The foot lever for raising and lowering the bridge is so simple, it needs no explanation as one can readily see its construction and use in the engraving.

Repairing Sarven Wheels.

JOHN C. SHAY.

In repairing Sarven wheels my method is to remove the tire and then cut every rivet and punch them out; then I re-



A DEVICE FOR RAISING WHEELS WHEN PUTTING ON TIRE BOLTS.

move the flanges and cut two gaskets out of canvas to fit the hub snugly and extend as far on the spokes as the flanges do. Now I make a mixture of red lead and any old paint I may have and a little turpentine and paint the hub, wood and spokes as far out as the edge of the flanges. Next I see how much packing the hub needs to fill up the space left by the shrinkage of the wood, and commence to wrap the canvas or muslin around the hub. I usually place two tacks in the end, as this enables me to draw the canvas snugly without slipping. I apply the paint as I wrap. When I have enough canvas on, I tack it again, paint the inside of the flanges and drive them down, all they will stand, with a hammer. I then place tire bolts or carriage bolts in the flanges and commence to screw them up. After I have the flanges up nearly snug, I remove opposite bolts, one at a time, and place and draw my rivets. I then set the tire with my wheel screwed down. I usually draw according to the season; in winter $\frac{1}{8}$ -inch and in mid-summer from $\frac{1}{8}$ to $\frac{3}{8}$ -inch, according to the size and strength of the wheel.

No Work the Hardest Work.

CAROLINE F. ORNE.

Ho! ye who at the anvil toil,
And strike the sounding blow,
Where from the burning iron's breast
The sparks fly to and fro
While answering to the hammer's ring,
And fire's intenser glow—
Oh! while ye feel 'tis hard to toil,
And sweat the whole day through
Remember it is harder still
To have no work to do.

Ho! ye who till the stubborn soil,
Whose hard hands guide the plow,
Who bend beneath the summer sun,
With burning cheek and brow—
Ye deem the curse still clings to earth
From olden time till now—
But while ye feel 'tis hard to toil
And labor all day through,
Remember it is harder still
To have no work to do.

Ho! ye who plough the sea's blue field—
Who ride the restless wave,
Beneath whose gallant vessel's keel
There lies a yawning grave,
Around whose bark the wintry winds
Like fiends of fury rave—
Oh! while ye feel 'tis hard to toil
And labor long hours through,
Remember it is harder still
To have no work to do.

Ho! ye upon whose fever'd cheeks
The hectic glow is bright,
Whose mental toil wears out the day
And half the weary night,
Who labor for the souls of men,
Champions of truth and right—
Although you feel your toil is hard,
Even with this glorious view,
Remember it is harder still
To have no work to do.

Ho! all who labour—all who strive—
Ye wield a lofty power:
Do with your might, do with your strength,
Fill every golden hour.
The glorious privilege to do
Is man's most noble dower.
Oh! to your birthright and yourselves,
To your own souls be true!
A weary, wretched life is theirs
Who have no work to do.



Cut out unnecessary expenses.
Spring's not as distant as it seems.
Let in all the sunlight you can these days.
Better a sharp tool than a sharp tongue
a hundred times over.

Twenty-three days only in February in which to do a month's work. Of course you'll take a well earned rest on the twenty-second of the month.

A Frenchman has invented a machine which he claims will automatically fill and tie forty packages a minute, the work of seventy men.

Keep in the swim. Don't persist in sticking to old worn out methods. Adopt

new, modern ideas. They are easier and better in every way.

Hard work and sound sleep are twin brothers. Ever look at it in that light? It is not the idlest man who is the most contented, not by a long shot.

Have you followed the various articles recently appearing on the subject of filling Sarven wheels? Discussions are splendid things for getting at the facts, and the reasons pro and con.

Skillful mechanics are writing regularly for our columns. We aim to print the very best shop information. Has your name appeared as the author of any article during the past year? Will it in 1905?

Make every minute of the day count. Then at night you can go home to a romp with the children or to an evening with your favorite trade paper, filled with a satisfying sense of a day's work well done.

No wonder that Carolina smith quit the business. Said it didn't pay. Come to find out, he had accounts on his books that hadn't been drummed up in years. No business will pay if the collecting isn't looked after.

In union there is strength. Organization and co-operation can bring about reforms which smiths as units could never accomplish. A higher scale of prices is only one of the benefits, but this alone should be sufficient to make you act.

Natural gas has a high heating or fuel value, and is a very cheap and economical source of power. No smith with access to a steady supply of natural gas has any excuse for not installing a gas engine on the ground of high cost for power.

It often comes out that the foundations of many large fortunes have been laid by small savings in the beginning. Get into a new 1905 habit of putting by a certain sum regularly in a sound savings bank, even if the amount is small. 'Tis a good habit.

"I am greatly pleased with the results of my want advertisement in your paper," writes a subscriber. Do you wish a helper or a job; do you want to buy or sell a shop? If so, try an advertisement in our want column. Read by 25,000 smiths each month.

Smiths in all sections of the country are slowly but surely coming to a realization of the benefits and possibilities for betterment which lie in organization and co-operation. Now is the time to begin agitating the question of a raise in prices in your county next spring.

The mother of wealth is economy—an old saying and a true one when practiced in the right way. But economy doesn't mean doing without good tools when you need them. Hence it's true, though it may sound queer, that sometimes saving money is very expensive.

A Hungarian blacksmith recently sent, as a present to the Emperor of Austria, a horseshoe, a pair of pincers, a file and a knife, all ingeniously nailed to a goose's egg, without the egg being broken. The Emperor sent, in return, his photograph, a gold medal and 30 ducats.

Perhaps you have taken up some interesting side line since the last time you wrote us. Our other readers would like to know about it, and what profits there are in it.

The wide-awake smith always wants to hear about new things to make, new things to handle, new ways to fatten his purse.

Go out into the by-ways and high-ways and get some smiths who are not now subscribers to take THE AMERICAN BLACKSMITH. For each two you get we advance your own subscription one year. Isn't it worth while from your own standpoint? You couldn't do anything that would please us more.

Don't forget to write and get a fresh supply of the pink buffalo stamps when yours are gone. We have a large stock of these "buffalos," and will always be glad to ship new lots free to our readers. Keep them handy, and put one on every letter you write to anyone who is connected in any way with blacksmithing.

What power are you using in your shop? Numberless gas engines, steam engines, electric motors and water wheels are now at work spinning the wheels, driving the hammers and making the fan blast of smith shops. A York State craftsman reports the successful use of horse power for driving his machines. Has anyone harnessed up a wind mill?

The big iron man, Vulcan, a picture of which as it appeared at the St. Louis Fair was recently shown our readers, is to be exhibited at the Lewis and Clark Centennial Exposition. This fair will be held at Portland, Oregon, the first of next June till October 15th, and is to commemorate the expeditions of Lewis and Clark to the Northwest one hundred years ago.

That Lien Law advocated by the AMERICAN BLACKSMITH continues to attract attention. Smiths all over the country not only realize the immense value of such a measure, but being especially anxious to have us push it, have written us to that effect, sending us all encouragement and assurances of their conscientious support. Are you with us? Are you in line for a protective measure of this nature? If so, let us know today for we need your support.

The other day we got a letter from—well, after ten minutes' study on the part of the manager and three clerks we decided it was from our old friend, Tom Tardy. It was written with a coarse pencil on a leaf torn from an old yellow ledger. There was no date, and no address to show whether it had been written from Buffalo, a South Sea Island, or where. It was with great difficulty that the signature was made out. At the time this letter came in, there was in the office a prosperous smith from out of town who had dropped in to pay his subscription and also see his jobber while in town. Commenting on the appearance of Tom's letter, this successful craftsman said it was a pity some smiths were so careless about such matters. "I'll wager that every blacksmith in the land knows enough to put the date and address on his letters. It's simply carelessness on their part when they don't. They won't bother to take the time and trouble to write neat, clear letters, and it's an awful big mistake. A smith, to succeed, must be more or less of a business man, and no business man ever tries to get along without neat printed letterheads and envelopes. Printing is so cheap nowadays, there is no excuse for poor stationery."

American Association of Blacksmiths and Horseshoers.

Sessions of the Legislatures are being held this winter in the following States, among others: Michigan, North and South Dakota, Indiana, New Hampshire, California, Tennessee, Maine, Rhode Island, Connecticut, Texas, Nevada, Georgia, Colorado, North Carolina, Massachusetts, Arkansas, Florida and Idaho.

Every smith in these States, or any others, who realizes the need and importance of a blacksmith Lien Law should send his name and address to the above Association at Buffalo, stating his desire for such legislation and his willingness to support the movement for obtaining it. The time is flying, so that prompt action is necessary. Briefly stated, the purpose of the Lien Law movement is to obtain the passage of State laws which will enable a smith to place a lien on any horse or vehicle he has worked upon and thus obtain payment of his bill for services or material furnished. Let every interested craftsman send in his name as above requested, for enrollment as favoring this splendid measure.

The New York State Lien Law Bill.

On Jan. 30, Assemblyman Robt. Lynn Cox introduced in the New York State Legislature a lien law bill, as drawn up by the American Association of Blacksmiths and Horseshoers and as advocated by the AMERICAN BLACKSMITH, to allow blacksmiths to file liens on horses, mules or other animals, for shoeing bills. At the present time, the outlook for the passage of this bill is very bright, but to insure success, we need the earnest co-operation of every smith in the State. Let every New York State blacksmith who reads this article lend us his support. If you are willing to help us in helping you, then write a letter immediately to your State Senator or Assemblyman at Albany, or call upon him personally, if possible, and get his promise to support the bill, when it comes to a vote. Do this—today. The secret of success lies in prompt and vigorous action. After this, persuade some of your brother smiths of New York State to write to their representatives also, thus awakening a general interest in the proposed law. When the legislators receive these requests from the men on whose votes they are dependent, naturally they will interest themselves in the Lien Law Bill to the extent we desire.

Let every smith lend his hearty sup-

port and New York State will soon boast of a blacksmiths' lien law.

The Hinds County Association of Mississippi.

Among the latest branch associations to be formed under our auspices is the Hinds County Association, State of Mississippi. The members of this branch were quick to see the benefits of co-operation and higher prices, and are to be congratulated upon their success. The following schedule has been adopted:

Horseshoeing.

Resetting old shoes, each.....	\$.25
New shoes, flat or with heels, per pair	.75
Single shoes, each.....	.40
Hand-made shoes, each.....	.75
Bar shoes, each.....	.75 to 1.00
Steel toe calks, each.....	.12½
Trimming feet, each.....	.05
Sharpening points, each.....	.15 to .35
Tips welded on points, each.....	.30 to .75
Twist clevis for plow, each.....	.25
Cross clevis for plow, each.....	.25
Plow beams.....	\$1.00 to 2.00
Plow handles, each.....	.50 to .75
Plow rounds, each.....	.15
Sharpening road scraper blades....	3.50

Buggies.

Axle stubs, 1 to 1½ inches.....	7.00
Setting axle.....	1.00
Welding and setting axle.....	\$1.50 to 2.00
Cutting and rethreading axle.....	1.50 to 2.50
New set of tires, ¾ to 1 inch by 1½ or 1.....	7.00
New set of tires, 1½ by 1½ inches....	7.50
New set of tires, 1½ by 1½ inches....	8.00
Resetting buggy tire (cold).....	2.00
Resetting and wedging wheels.....	3.00
Pole or shaft couplings, each.....	.50
Bradley couplings, per pair.....	2.50
New fifth wheel put in.....	1.50 to 2.50
New buggy spring put in.....	2.00 to 3.50
One leaf put in spring.....	1.00
Welding one leaf.....	.75 to 1.00
Clips put on, each.....	.25
Buggy shafts put in.....	1.25 to 2.00
Cross bar put in.....	.75 to 1.00
Buggy reaches, each.....	1.00 to 2.50
Spring bars, each.....	1.00 to 1.50
Axle stocks or beds, each.....	1.50 to 2.00
Head blocks, each.....	1.50
Side bars, each.....	1.50 to 2.00
Sarven wheels, grade B, old tires, ..	16.00
Sarven wheels, grade C, old tires....	14.00
Sarven wheels, grade D, old tires....	12.50
New Sarven wheels, grade D, with new tires, per set.....	12.50 to 16.00
Half rimming one wheel, woodwork only.....	.75
Patent spokes, each.....	.20 to .25
Setting boxes in new wheels, each..	.50
Setting boxes in old wheels, each..	.25
New buggy pole factory made....	6.00
New buggy pole, complete, hand made.....	8.00 to 12.00
Pole and circle put in.....	3.00
Pole only.....	2.50 to 3.00
Circle only.....	1.00
Single trees.....	.50 to .75
Double trees.....	1.00
Neck yoke (wood) put in.....	.50 to .75
New pair of shafts with cross bars, wood only....	2.50 to 3.50

Wagon Work.

Filling wagon wheels, set.....	\$14.00 to \$18.00
Filling and rimming one hind wheel .	4.00
Filling and rimming one front wheel .	3.50
Filling hind wheel, spokes only.....	2.50
Filling front wheel, spokes only.....	2.25
Setting and welding tires.....	.70
Rimming wheels sawed felloes.....	8.00

Rimming wheels, bent felloes, set...	7.00
One rim only, bent felloes..	1.50 to 2.00
Half rim only, bent felloes..	.75 to 1.00
Sawed felloes, each.....	.25 to .50
Spokes, each.....	.20 to .25
Tongue and hounds, woodwork....	3.50
Tongue only.....	2.00
Cross-piece.....	.25 to .40
Axles from 2½ to 3 inches.....	3.00
Reaches.....	1.00 to 2.00
Hind hounds, each.....	1.50
Front hounds, each.....	1.50 to 2.50
Bent hounds.....	3.50
Front bolster, with old standards...	1.50
Hind bolster with old standards....	1.75
Hew standards, each.....	.25 to .75
Sand board.....	1.50 to 2.00
Sway bars, each.....	.50 to 1.00
New wagon body, one coat of paint, no top.....	8.00
New top.....	3.00
New bottom in old wagon body.....	2.50 to 3.00
New cross-pieces, each.....	.50 to .75
One new side, put in wagon.....	2.00
Two new sides, in wagon.....	3.50
Wagon seat, wood only.....	2.00
Spring blocks each.....	.50
Double trees.....	.75 to 1.00
Single trees.....	.75 to 1.00
Breast yoke.....	.50 to .75

How to Make Locomotive Boiler Rings.

W. B. REID.

Fig. 1 represents two heavy boiler rings we are required to make, fifty-eight inches outside diameter. A is made of 2½-inch square iron.

Good, rolled bar iron (being more fibrous and uniform in size than the forged bar) will prove the best material for the purpose. It is particularly important, at the outset, to have the bar perfectly straight and out of twist. Otherwise, when turned in the rolls the ring will be found of irregular, "kinky" surface, involving considerable trouble to correct afterwards.

The surest and quickest way to estimate the length of the stock required is to figure it mathematically. This is easily done by multiplying the mean diameter of the ring by 3½, or more accurately, by 3.1416. By the mean diameter is meant the distance across from center to center of the iron as shown by the dotted lines in A. This rule applies to all rings figured in this way, no matter what the width or thickness of the iron or whether bent upon the edge or upon the flat.

By simply deducting one thickness of the iron, 2½ inches, from the outside diameter of fifty-eight inches, we find the mean diameter of ring A to be 55½ inches. This, multiplied by 3.1416 gives the length of the bar required, "butt" and "butt." Thus, 3.1416 x 55½ = 174½. A variation of this rule is to multiply the mean diameter of ring by 22 and divide the product by 7, thus (55½ x 22 ÷ 7 = 174½).

The ring may be scarfed as shown in Fig. 2 at C and D. While scarfing,

about a foot of each end should be circled to the radius of ring, before rolling. In each case the "butt" and "butt" measurement of the stock would be from the points indicated by the arrow heads C and D.

When rolled accurately the scarfs, as at C, should come neatly together, making a strong, easy weld. The scarf as at D, will generally prove the most convenient, allowing free adjustment of the ring, which is not always rolled perfectly level. This is welded with a V plug. We have seen boiler rings welded "butt" fashion, E, a piece of iron sometimes inserted between to adjust the ring to size. This does not ensure a reliable weld, it being very apt to break apart when the ring is finished and being riveted in the boiler, a result involving a very considerable loss of time and labor.

Where boiler-shop rolls are not available, these rings may very conveniently be turned hot upon "formers" fastened to a suitable face-plate as shown at F, Fig. 3, a lever or "weeze" being used to apply the iron closely to the "former."

The writer has made boiler rings in this way, turning them in two heats by heating the iron in a long spring furnace. Although apparently old-fashioned, this method makes a good job. The ring adjusting itself to the face-plate is perfectly level, and is free from the strains, cracks and cold shuts often resulting from the stretching of the outside, and the upsetting of the inside circumferences of the ring, which is the case when rolled cold.

This tendency might be avoided by pulling the iron evenly through the fire sufficiently to take the chill well out of it before rolling. When turned hot, as

is indicated at G, Fig. 2. The heats are taken from the sides. We have seen rings like this scarfed to weld, as shown at H, Fig. 2, by the insertion of two V plugs. In this case, with the iron so thin, the best results would not be obtainable by such a method, which is probably chosen because of a lack of confidence to estimate the stock accurately otherwise. When possible, a ring of this kind should always be rolled, being much more difficult to turn on formers than those made of square iron. Levers of sufficient weight to balance the rings in crane are, of course, required to handle them when welding.

A boiler dome ring, made of 6 inch by $\frac{3}{4}$ inch iron, bent upon the edge, is probably as stiff a proposition as any. In the absence of more pretentious appliances, the best way we have found to turn such a ring is to bend about a foot of it at a time upon a former made to a small segment of the inside circumference of the ring. This is bolted to a face-plate heavy enough to withstand the strong pull necessary to turn the iron upon edge. At one end of the former is a strong adjustable clamp that can be quickly screwed or unscrewed as required, to hold or release the iron, I, Fig. 3. With a handy face-plate perforated with holes as at F, Fig. 3, a lever similar to that shown at will greatly help to bring the iron around the "former."

Various formers are used for bending pipe. The lever and shoulder on the

a shoe one size larger than you would use for ordinary shoeing, and the nail holes as close to the heel as possible. Then cut the shoe $\frac{1}{4}$ of an inch longer than the foot from the side next to the hoof and turn the heel down to bottom of shoe. This gives you a round end on the heel, so that when the mule steps close over a tie, the round heel will slip off without pulling the shoe off, whereas, a square heel will catch in or under the tie and pull the shoe off in spite of its

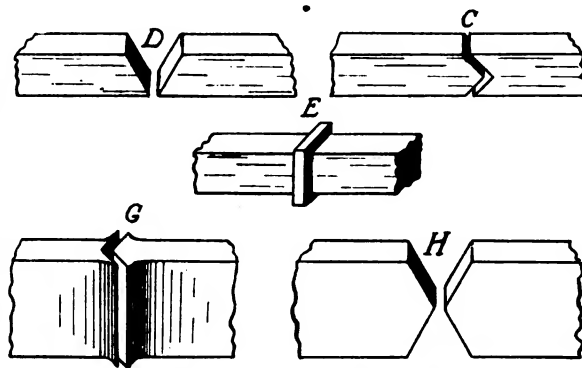


Fig. 2.—VARIOUS METHODS OF PREPARING JOINTS TO BE WELDED.

being put on good. Next fit the shoe on the foot cold, not hot, and use about a No. 7 Capewell nail, and get your clinches close in the hoof. Do not rasp the hoof off even with the shoe, just let it project, as the hoof rots quicker if you rasp off even with the shoe. I have tried all kinds of shoes and shapes, calks and toes and calks alone, and plain shoes, but they came off without any difficulty, until I tried this way of shoeing. It was a great relief to me and also to the mules.

Filling Sarven Wheels.

ALEX. SNIDER.

I read in the October issue of THE AMERICAN BLACKSMITH the article of H. K. Van Tyne & Son in regard to filling Sarven wheels. Now while I have neither had 14 years' experience in a factory nor 19 years in a repair shop, yet I am of the opinion and do know that Sarven wheels can be successfully repaired, when the rivets are cut, yes, only then.

I have seen dozens and dozens of wheels repaired as these gentlemen suggest, and just that many poor jobs were the result. On the other hand I have had excellent success repairing Sarven wheels by cutting the rivets. If such a terrible pressure is necessary as they say, in order to make a good job, then where does the pressure come in on the spoke when the most essential part is cut away as is the case with

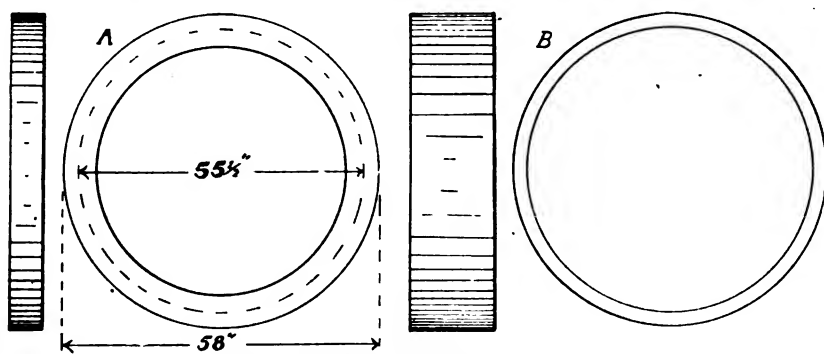


Fig. 1.—SHOWING THE RINGS TO BE MADE.

described, the ring is scarfed and welded as at D, Fig. 2.

In the case of the flat ring, B, Fig. 1, made of 7-inch by $1\frac{1}{4}$ -inch iron, the same rules of estimating the stock apply as in the first instance. The best way to scarf and weld a ring of this kind

face plate are grooved, and the pipe is filled with sand to prevent kinking.

A Few Good Points on Mine Shoeing.

J. B. S.

I give herewith a few points on mine shoeing. The first thing to do is to get

the method they describe? In cutting (as they do) a notch in the spoke to receive the rivet, there is a vacant place between the rivet and the wood part of the hub. This is exactly where the spokes should fit the most perfectly. I go about the work of putting in spokes as follows: Cut only one and not more than two rivets, take out the old spokes, fit in the new ones snugly, then bore a hole through the spokes the exact size of the hole in the flange, find a rivet (I always keep on hand a good assortment) to fill the hole tightly, cut the proper length and by laying the rivet head on the anvil draw the rivet up tight with a riveting hammer, and when this is done I take the next two rivets out and proceed as stated before, and when all spokes that are defective have been replaced, you have a solid job.

I have repaired many wheels to the owners' entire satisfaction, after the method of Messrs. Van Tyne & Son had been tried on the wheel and proven worthless. I would add, that where a Sarven wheel needs more than two-thirds new spokes I never advise my customer to have it repaired, but to buy a new wheel. By this, I do not wish to intimate that I have never filled a Sarven wheel with an entire set of new spokes, as the contrary is true. I always buy my Sarven spokes from a reliable dealer as, when made by a skilled mechanic, they fit very tight, which is essential for a good job and they can be done by hand only at a waste of time, which is generally worth more than the cost of the spokes.

Method of Making a Plow Point.

J. A. LOWRY.

The first thing to do in making a point is to turn out a bar to fit the frog as well

ing, and if a sloping bar it should look like N. Be sure to get your bar hollowed out or low enough at the points marked A.

When you have your bar so that it fits good, with just enough pitch, clamp it to your plow, procure a piece of pasteboard and cut out a pattern of the point or share so it will fit the mould board and not come over your bar, but just flush with the edge. Better not let it come quite to the outside of the land side at the point, for when you sharpen it you will find it will turn to land, therefore make a little allowance for this. Now, if you have followed directions, you are ready to cut out the share. Lay your pattern on your steel, which should be $\frac{1}{4}$ -inch thick and any width, mark out your share and be sure that you mark according to your pattern, as much depends on this in getting a fit. Having marked out the share, lay the slab on the fire and heat to a blue heat, but not red, then take it out and with your set hammer cut out your share over the sharp edge of your anvil. I say set hammer, but you can make a much better tool than this, to cut in the same way. I will describe it at some future time if any brother wants me to. In cutting steel this way it requires some skill and possibly some one will say it is a failure, but I make from two to four shares, for turning plows or listers every day, and I don't pretend to cut them out any other way.

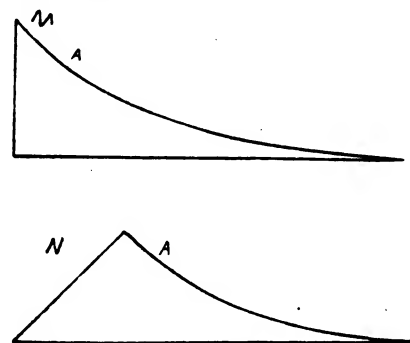
In sharpening a share always sharpen from the bottom, that is, if a new one is to be made. After having sharpened your share bend it and fit it to the bar which you have clamped to your plow. See that it fits perfectly before you attempt to weld it. Now, are you going

I will give, in some future article, how to make a pair of tongs for holding your bar and shares together while welding.

A Short Talk on Interfering.

O. W. TAYLOR.

Interfering is one of the most difficult things which the shoer has to contend with, and the first thing to be done is to find out the cause. If it is due to faulty driving, tell the owner in a tactful way. In my opinion, very few horses interfere that are driven properly, although there are some, of course, that will interfere, no matter how they are driven. The cause of this may be deformed legs, cracked ankles or feet, or



METHOD OF MAKING A PLOW POINT.

improper shoeing. Is it not the case that of all horses that interfere, the greater number, if not all of them, are young horses, between three and five years? When horses reach the age of five or six, the shoer can in most cases, without much bother, shoe them so as not to interfere. One reason why young horses are apt to interfere is because they have not the shape or strength to handle their legs without one coming in contact with the other. Another reason is that they are thin in flesh. This is where the owner can help the shoer a great deal. I have seen some men who call themselves expert shoers rasp nearly half of the foot away to stop the horse from interfering (which will stop it for a while in most cases), just to have the name of a good shoer. Is this right? The owner of the horse perhaps does not know any better, but the shoer should. For as I said, the case is mostly in young horses, and when they have the flesh on them as well as the age, a thing like rasping $\frac{1}{4}$ or $\frac{1}{2}$ of an inch off of the inside of the foot is of no use. I would rather see a young horse with a good foot interfere for a short time (for you can put a boot on him, so that he will not cut his legs open) than to see a horse not interfere, with only a little more than half of the foot that he should have. And when he is older you

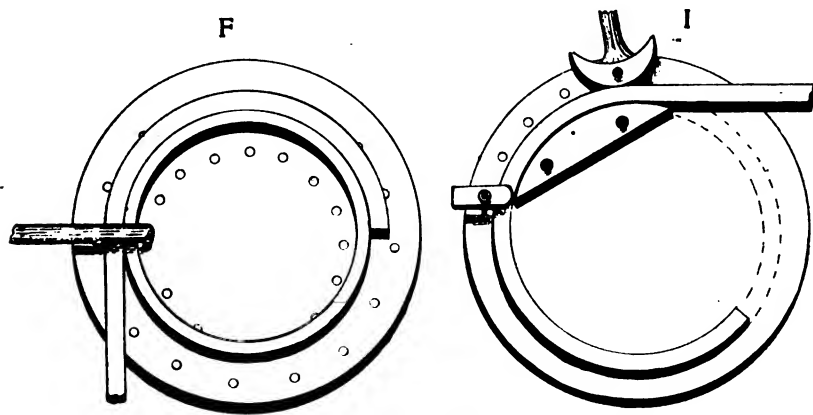


Fig. 8.—FORMERS USED FOR BENDING BOILER RINGS.

as the one did that was made at the factory. Use $\frac{1}{4}$ -inch iron or machine steel and if it is what we call a square bar, it should look like M in the engrav-

to bolt it on and weld the point while on the plow? No, you will take a pair of tongs suitable to hold it with and weld it up before drilling a single hole.

can shoe without trouble. We all believe in the old saying, "No foot, no horse."

My method of shoeing horses that interfere is to see that the foot is level, a little lower on the outside than on the

ment, the fore feet are to be balanced from mechanical and physiological standpoints. The head and neck should be drawn down by the standing martin-gale. This will shift the center of gravity further forward and immediately relieve the hind parts of the excess of labor as burden bearers. Then the hind hoofs must be dressed to increase the ground surface, which means an increase in the length of the stride without correspondingly retarding the action. Hence the hoof behind should be dressed with comparatively long toes and high, not low,

flexors and causes them to quicken their flexion by knee action. The absence of weight at the toe of front hoof both shortens and lessens the velocity of the front stride. Thus the two pair of actions, are brought into coincidence. If the toes of the front feet are shortened, then the forward action would be both too rapid and too short, which would defeat the movement sought.

When the Hind Action is Too Short and Rapid.

This is a more common defect. In the first place the head and neck are to be elevated so as to throw the burden of the carcass on the hind quarters. The ground surface of the hind foot must be lengthened, which retards and lengthens the stride of the hind limb. If this is not adequately effective, then a low toe calk can be welded upon the shoe, or it may be gradually drawn from a thick toe to a thin heel. Raising the head and neck will elevate and quicken the front feet, and if the English concave-seated shoe or plain shoe does not promote a sufficiently rapid action of the front limbs, the rolling motion shoe, in some of its various forms of construction, will supply the deficiency.

Hind Action Too Long and Slow.

This is commonly known as action of dwelling behind. Now, if the hind action is too long, the toes must be shortened; this will lessen the ground surface over which the body is lifted and propelled, and thereby both shorten and quicken the hind action. The shoe properly constructed will exercise an active agency. It should be made



A PRIZE COLLECTION AND THE MAKER.

inside. This will throw the ankles apart. I do not turn the inside calk of the shoe in under the foot, in most cases, but instead, I let the shoe as nearly straight inside as possible, being very careful not to fit the shoe so that I have to rasp too much off of the inside of the foot and thus ruin it. I do not mean to say that these young horses will not interfere when they get old (that is if not properly shod), but you can shoe them so as not to interfere to a better advantage, leaving the horse with a nice, good foot. There are some old horses that interfere and the shoer must study each one's case, and after finding the cause, act accordingly.

A Prize-winning Exhibit.

The accompanying engraving shows Mr. David Baer and his display of smith work. This display took the first and second prizes and also a special prize and a diploma at the Croswell Fair.

It will be seen that the collection contains not only every shape of horseshoe, but butcher knives, hammers, wrenches, screw bits, a draw knife and a box hook.

The maker of the collection is 76 years old, still runs a shop and is doing a good business. It is very apparent that he is heartily in favor of THE AMERICAN BLACKSMITH and its policy. ¶

Shoeing to Correct Forging and Other Defects.

E. W. MATTHEWS.

When the hind action is too short and slow, compared with the front move-

heels. The shoe should be heavier than the front one, and fitted exactly to the foot, while the front hoof should have a low heel and a light toe. The low heel, either by paring down the posterior branches of the foot, or by widening and then by thinning the posterior web of the shoe, will retard the front action, or the "light shoe," which consists in cutting out the web of the shoes at the forward arch and around the toe one-half the



A WELL EQUIPPED SHOP IN NEBRASKA FOR GENERAL WORK.

width it was before the chisel was applied. The intention is to retard the front action, and not lessen the knee action, because then the quickened hind movement will at once interfere with the front articulation.

The weight at the heels taxes the

heavier than the front, fitted short and close at both heels, and made rolling motion or scooped toed at the toe. Then the hind action will become measureably shorter and quicker. The head must not be raised higher than its natural carriage, but rather be drawn

down so as to relieve the hind quarters of its excessive burden. Then the front action must be lengthened, rather than shortened, or quickened, and this can be obtained successfully by the low heel and long toe, either by so dressing the hoof, or by drawing a thick toe to a thin heel.

The Hind Action Too Long and Too Rapid.

The head should be raised. That alone will tend to elevate and quicken

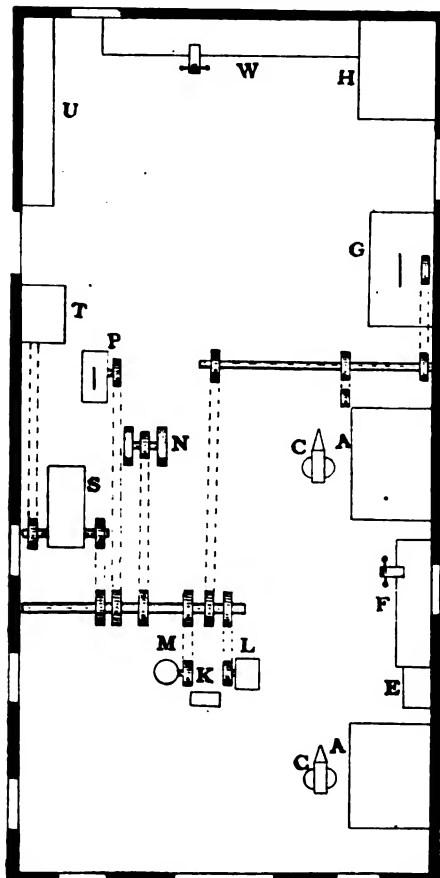


DIAGRAM OF THE NEBRASKA SHOP.

the front action, while it will shorten and lessen the hind action. The hind hoofs should be armed with tips not more than two or three ounces, and the toes and heels behind neither too long nor too high, but dressed to a medium height and length. If the ground surface of the hind feet is lengthened, the stride, already too long, is still more extended. On the contrary, if the toes behind are shortened and the heels left high, then the stride is already too rapid and is still more accelerated. So the toes are to be dressed neither too long nor too short, and the heels neither too high nor too low, but to be left to their normal length and height. Lessening of the length and rapidity of the hind stride is to be regulated by the lightness of the tip. If the tip is inadvisable, an extremely light shoe, with light heel calks and the outside

heel calk "thrown," will admirably answer the purpose. The heel calk acting as a check, will catch the hind feet on the ground and the stride is shortened. The front shoes should be made heavy to lengthen and quicken the front action.

When the Front Action is Too Short and Too Slow.

The front action can be quickened by an elevation of the head and neck, enough to throw the weight back toward the hind quarters and yet not disturb the equilibrium of the trotting action. The front action can be extended by welding a long, low toe calk onto the front shoes and making them so much heavier than the hind shoes, that the difference will harmonize the action of the front and hind pairs of feet. The front action can be extended by lowering the heels of the front feet without permitting the toe to grow out to an abnormal length. This, like expediency of long toes, practically extends the ground surface of the front feet without inducing any of the resulting ills of long toes.

These precautions will both elevate, quicken and extend the front action sufficiently, without producing any of the injuries resulting from long toes or ponderous toe weights.

Front Action Too Short and Rapid.

The toe should be permitted to grow to its natural length and the shoe drawn from the toe to an appreciable thinness at the heels; not only an undue elevation and arm cutting is obviated, but the front action is materially lengthened and retarded. When this is accomplished the hind feet need not be tampered with and an ordinary hind shoe fitted to the wall of the foot will answer.

Front Action Too Long and Slow.

The heel of the hoof should not be pared down, but left measureably long and the toe shortened. If the forward arches of the front shoes are made on rolling motion, the front action will still be more accelerated and shortened. Then the head is slightly elevated and the front action can be successfully brought into harmony with the hind movement. The hind feet should be armed with light shoes, either plain or, what is preferable, provided with low upturned heels.

Front Action Too Long and Rapid.

This defect is more difficult to obviate and, fortunately, it very rarely occurs. The front heels must be lowered, while the toes should be shortened. This will increase the downward and upward articulation, while the lessened ground surface will shorten the stroke. The

shoe should be made as light as balanced action will permit. In fact, this is pre-eminently a case for tips, fitted close to the forward branch of the foot, and terminating in the center of the quarters. This, in connection to adding more weight to the hind feet, will generally remedy the defective movement.

Both Front and Hind Action Too High, Rapid and Extended.

Nothing will succeed in this case like tips all around, fitted the width of the wall. A horse shod in tips should not be speeded in bare heels before they are hardened to the new position.

A Well-Equipped Nebraska Shop.

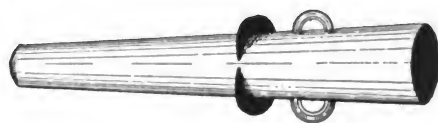
J. W. FOKORNY.

The accompanying diagram and engraving show a plan and an interior view of my shop, which is 26 feet by 56 feet. I have a gas engine in my shop, which runs a rip saw, a planer, a cross-cut saw, a trip hammer, a drill, a blower and an emery wheel. I do blacksmithing, horseshoeing, wood working and a general blacksmith business. In the diagram:

A represents the forges.	K, the shears.
C, the anvils.	L, the trip hammer.
E, a bolt rack.	M, the drill.
F, iron rack and bench.	N, the emery stand.
G, a cross-cut saw.	P, the rip saw.
H, the coal bin.	S, the gas engine.
	T, a planer.
	U, wood rack.
	W, wood bench.

A New Pole Tip for Buggy Tongues.

The sketch herewith is that of a new pole tip for buggy tongues, as invented by J. L. Bjorkman, of Underwood, Iowa. It is somewhat longer in shank than the usual pole tip,—about three inches. Just behind the collar on either side are



A SAFETY TIP FOR BUGGY TONGUES.

two eyes, where a safety strap can come from the harness and fasten to the pole tine, and thus prevent accidents which often occur when the neck yoke breaks. A tip with a long shank would be very useful in repairing tongues broken off close to the tip. It can be made very easily from gas pipe.

A Few Shoeing Pointers.

O. W. TAYLOR.

Horseshoeing is a necessary evil, and when practiced at all should be done as near barefooted as possible. Circumstances, of course, alter cases, but most always the method of shoeing flat is the best for the horse in the long run. As to

the time a shoe should remain on the foot, this depends entirely upon the shape of the foot and the kind of work to be performed. A horse that has a flat foot needs the most attention, and in most cases the shoes ought not to remain on longer than three weeks. Great care should be taken in fitting shoes for such horses. The first thing to do is to see that the shoe does not lie on the inside of the foot. Concave the shoe, leaving not less than an eighth of an inch between the shoe and the inside of the foot. Also see that it has a level bearing on the shell of the foot. Great care should be taken when punching the nail holes in the shoe. Make them for as small a nail as you think will hold the shoe for the time that it has to remain on the foot, and see that the nails fit tight in the holes. Avoidance of this rule is the reason some smiths have trouble in keeping the

be made of pieces of oak or ash, $1\frac{1}{2}$ by $1\frac{1}{2}$ by 36 inches. These to be glued together and then iron rods put through at each end six inches from the edge. This makes a top that will not warp. The balance of the frame can be made of yellow pine, mortised and tenoned very solidly together.

In Fig. 1, A is the table top, B is part of the frame and should be 4 by 4 inches and mortised as shown. It requires two of these, one on each side. FF are not shown in the side view of the table. They are cross pieces and are tenoned at both ends and hold BB together at each end. EE are the legs, 4 by 4 inches. They are tenoned at one end and fit into a mortise in B. DD are two uprights. They are 4 by 4 with a $\frac{3}{4}$ by $\frac{3}{4}$ -inch groove in the center, so that G can slide up and down in them. This allows the spindle to be raised and lowered. The two pieces, DD, should

halves, so you can have a set screw to take up the wear. Running this box must be the last thing you do. To put the pulley on L, I take $\frac{1}{2}$ -lumber and with my hand saw, cut out eight or twelve little wheels about four inches in diameter and bore a $1\frac{1}{4}$ -inch hole through them. I place one of these wheels on my shaft, take wedges dipped in hot glue and drive them in good and tight all around the wheel. Now proceed with the other pieces in like manner, using glue liberally. See that the shaft is perpendicular, is just where you want it to set and that the screw J works good. Also that G works good in the grooves in DD.

The cutters for this machine are held by collars MM, Fig. 2, which have V-shaped slots in them. NN are the same collars, but show how they are placed on each other. The cutters all fit in between those collars. Collars that are

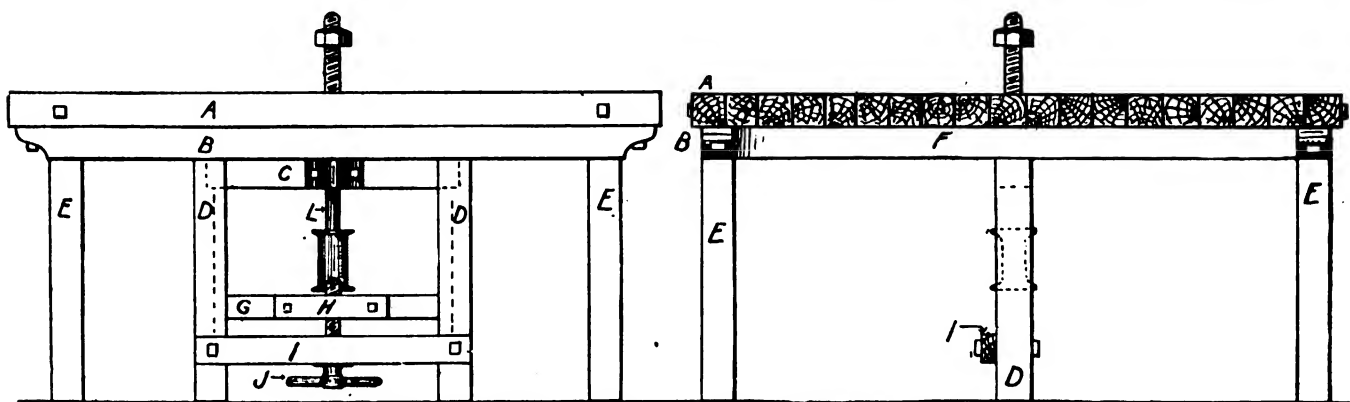


Fig. 1.—SHOWING SIDE AND END VIEWS OF WOOD-WORKING SHAPER.

shoes on the horse's feet. When resetting the shoes, take out the nails so as not to make the old holes too large, although they will, of course, become a trifle larger. When you have the feet properly dressed, proceed to nail on the shoe, using the old holes, if possible, and one size larger nails than the first time, so that the holes in the shoe and foot are filled tight. When the nail holes get too large, put the old shoes on the scrap pile and make new ones. Never attempt to take off an old shoe without first loosening the clinches, as great damage may be caused by these small hooks. If you have any rasping to do on the outside of the foot after the shoe is on, do not do any above the clinches, for the less rasping on the outside of the foot the better for the horse.

Plans for Making a Woodworking Shaper.

A. READER.

The frame or table of this shaper should be made very heavy. The heavier it is the better. The top should

be tenoned at one end and fastened by timbers in the center line of the table top. L is the shaper shaft. It works through the center of the top and DD set in line with it, 14 inches apart. C is bolted to D and the box which the shaft runs in is bolted to it. A $2\frac{1}{2}$ -inch hole is cut half way through G, and L, after having a groove turned in it at the lower end, is set into it. Your babbitt is now poured in so as to hold L in place. The cross piece G is thinned at both ends so as to slide up and down in the grooves in DD. I is bolted to DD 6 inches from the floor. J is simply an iron vise screw and is put through I, as you would put it on a bench. The vise box which has the threads in is put in H, which is bolted to the side of G. This screw moves G up and down, which in turn moves up and down through the box on C. The shaft L is $1\frac{3}{8}$ by 30 inches long. Seven inches of one end is turned down to $\frac{3}{4}$ inches in diameter and is then threaded good and deep. The box in G may be run in two

used as washers under the other collars or on top of them are used so as to have the cutters higher or lower. Of course, with every cutter you must have a blank piece of steel for a balance and support between the collars or in the grooves opposite the cutter. You can also run small circular saws on this machine, and the more you use this shaper the better you will like it and the more you can do on it. You can buy cutters that are reversible (run either way), and you can also get a friction pulley which will run this machine either way.

Shoeing to Cure Stumbling.

L. H. PINNELL.

The first thing to do in this class of shoeing is to get a foot leveler, as a perfect job cannot be done without it. There are few shoers who do not realize the necessity of this tool for this class of work.

After pulling off the old shoes, trim the feet to an angle of 50 or 55 degrees. Then take a shoe of the size and weight wanted and weld a good, long calk

lengthwise of shoe at each heel. Draw each calk to an incline, towards the toe, making a good, high spring heel, but no calk at the toe. Now heat the toe of the shoe and rasp it off, making the toe square and to measure about two inches from crease to crease. Fit the shoe flush, except at the toe, which should

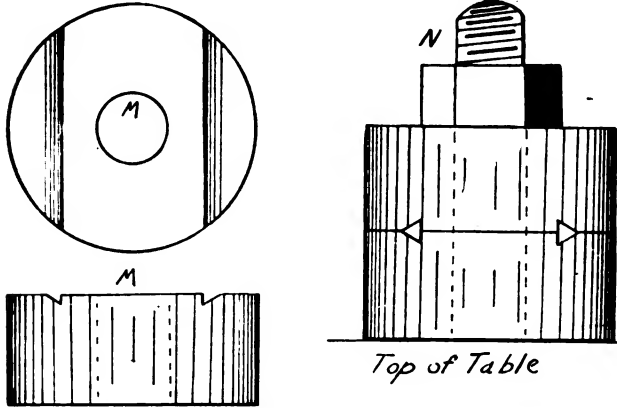


Fig. 2.—SHOWING COLLARS AND METHOD OF USING ON SHAPER.

project over the shoe and should be rasped off so as to be flush with the shoe. If the above method is followed I don't think any trouble will be experienced with stumblers. I treated two of my own horses for stumbling in the manner here detailed and a complete cure was effected.

Diseases of the Foot—Causes, Symptoms and Treatment—6.

W. O. JULIUS.

Navicular Disease.

This is an inflammation of the sesamoid sheath and is usually caused by concussion, although it may be hereditary. It may also be caused by dry stables, bad shoeing, punctured wounds, and heavy pulling.

The early symptoms of this disease are generally very obscure, and it may be some time before any lameness is seen. While at work the animal apparently travels well, but if watched closely he will, after a time, take a few lame steps and then travel as well as ever. This occasional lameness will gradually increase and become more apparent as the disease advances until finally the animal is constantly lame and the more he is used the greater will be the lameness.

It may be well to say that the treating of this disease is seldom successful. In the early stages of the disease the walls of the heels may be rasped away as directed in the treatment for contracted heels. The coronet should be well blistered with Spanish-fly ointment and the animal turned into a damp meadow. At the end of about three weeks the

blister should be repeated. This treatment should be continued for two or three months. Plain shoes are to be put on the animal when returned to work and in chronic cases the horse is to be put to slow, easy work only.

Ringbone.

This disorder is a growth or tumor on the ankle and properly speaking, is the result of an inflammation of the bone tissue of the two pastern bones. It may be caused by sprains, blows, overwork in young animals, fast work on hard roads and jumping. Improper shoeing is also a predisposing cause of this disease.

The first symptom of a ringbone is a more or less acute lameness.

However, if the tumor forms on the side or upper parts of the large pastern, no lameness appears. But when the tumors form, encircling the whole ankle or between the small pastern and the coffin bone, or under the flexor or extensor tendons, the lameness is always severe. Accompanying the lameness the ankle will also present more or less heat, and in some instances a slight swelling over the seat of inflammation. The lameness accompanying ringbone is characteristic. When the disease is present in the foreleg the heel of the foot is placed on the ground first and the ankle is kept rigid. When the disease is in the hind leg, the toe strikes the ground first, but the ankle is held as rigid as possible. If, when present in the hind leg, the bony tumor is under the front tendon or involves the coffin joint, the heel is placed upon the ground first.

The treatment for this disease consists of cold baths and wet bandages before the bony tumor has commenced. However, if the bony growth has started the firing iron should be used. When the tumor interferes with the action of the tendons, recovery is impossible, although the animal may be made serviceable by proper shoeing. If the animal walks with the toe on the ground, he should be shod with a high heeled and a low toed shoe. In like manner, if he walks on his heels, a thin heeled and a high toed shoe should be worn.

The importance of a ring bone depends on its location and size. If it interferes with the joints or tendons, it

may cause an incurable lameness. Since this disease is considered hereditary, no animal suffering from it should be used for breeding purposes.

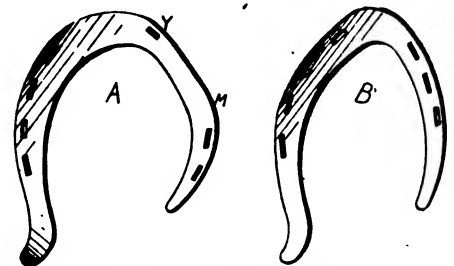
(To be continued.)

Practical Horseshoeing.—Interfering Hind.

C. D. BRIDGELL.

In speaking of interfering I find that more horses interfere with their hind feet than with the front ones, so I will endeavor to give my experience on this branch of interfering. When an interfering horse is brought in for me to shoe I ask the following questions: 1. Has this horse always interfered? 2. Does he interfere when he is barefoot? 3. Does he interfere when he is in slow gait? If the answer to the first question is yes, I then know the reason for his interfering is that his limbs are not of the right conformation and consequently examine his limbs closely and seek to ascertain the cause. If the horse does not interfere when barefoot then the reason is improper shoeing, and if the answer to the third is that he interferes when driven up to his speed then he is a toe-wide horse, or in other words, his feet toe out and it is quite likely that the point of contact is the inside toe. If he interferes when driven slow it is quite likely that the point of contact is the inside quarter of the heel, or at about the last hole in the shoe near the heel.

The foregoing are a few things to know, but if you want to be certain of your case it would be well to get up behind the horse to see in what shape he handles his feet. If he is a toe-wide horse, his hind foot will straighten out behind his other foot instead of being in line with the front foot on the same side. It will be more in a line with the opposite front foot. When he brings



SHOES TO CURE INTERFERING.

his foot past the one on the ground it is then when he interferes and you should notice carefully which part of his foot comes closer to the fetlock or the place which he strikes and whatever part comes closer or strikes that part should fit close when you shoe him.

A great many smiths think that it is all in the shoe, but it is just as much, or

more, in the way you prepare the foot for the shoe. You should not pare the feet to make them look pretty if you want to stop interfering, but you should trim or pare the foot in conformation with the limb which the foot is on. For instance, if the horse's leg slants under his body he bears most of his weight on the outside of his foot and wears out his shoes on the outside first.



Fig. 1.—FORGING. A, PASSING CLEAR. B, IN ACT OF STRIKING.

Thus, such a foot should be left high on the inside and low on the outside and shod with the shoe shown at A. It should fit close at the point of contact, Y to M, and the outside quarter of shoe should be rolled up. If the point of contact is the inside quarter or near the heel, then shoe with the shoe shown at B, with a straight inside and a sharp toe and the outside quarter turned up to make him break over on the outside quarter.

The shoer has to use his own judgment in his various cases, first find the cause and then the cure. A good way to find the exact place of contact is to use some paint on the hoof, say white paint on the foot and red or black paint on the fetlock, and one will color the

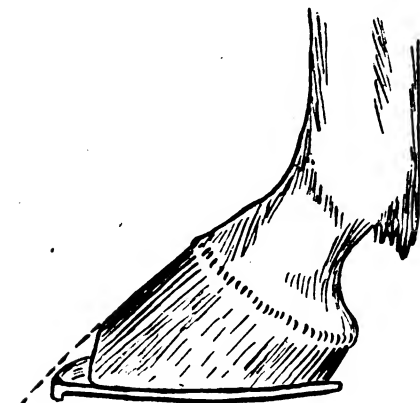


Fig. 2.—TOE WORN SHORT. DOTTED LINE INDICATES NORMAL DIMENSIONS.

other when he strikes, and you can tell the exact place of contact. If paint is not convenient use some grease on the fetlock and chalk on the foot or hoof.

The Causes and Treatment of Forging.

E. W. PERRIN.

Forging, or clicking, is peculiar to the trotter. It consists in the animal striking the toe of the front shoe with the

toe of the hind one (Fig. 1 B.), while in motion, thus making a peculiar "click-clack" noise characteristic of the defect and well known to all horsemen. The hind feet of a chronic forger become worn short at the toe from constantly striking the front shoe, but a like condition may also result from toe dragging. When a horse forges it is because the motion in front is too slow for that of

the hind, there is not a perfect balance of action, the motion is out of time.

Causes.

The principal cause of forging is defective conformation of the body and limbs, but there are other causes, such as pain in the front feet or legs, unbalanced feet or improper shoes. If a horse be coupled up short, with long legs, the feet move dangerously close together and as the knee and fetlock fold in action, the toe of the hind foot passes just under the toe of the front one (see Fig. 1, A). This is perfect going, but in order to maintain this equilibrium of motion all four limbs must move in perfect unison. If for any reason the front limbs move a little too slow, or the hind ones a little too quick—a half a second is sufficient—the hind foot will collide with the front one. The shuttle of a sewing machine must move in perfect time in order that the needle may strike the hole in the shuttle; the least moment out of time would result in collision. So in the locomotion of the four limbs of the horse, the front feet must pick-up just at the precise moment to maintain perfect unison with the hind ones. If there be the least moment delay in the pick-up in front the hind feet cannot pass under the front, hence the collision which is called forging.

Forging is common to young horses that have not settled down to their work. It is common to have a young horse commence to forge after a few days of severe road work, causing a dry, feverish condition of the feet. In such cases the resulting tenderness in the front feet delays the pick-up sufficiently to cause the trouble. Hoofs abnormally long, or too heavy shoes in front may

produce a like result. The idea that a toe weight shoe is a sure cure for forging is erroneous; a heel weight shoe is more often successful. It is common to see a horse forge with one foot only. In such cases look out for corns, side bones, thrush in the frog, etc.—some pain in the foot or leg that throws that limb out of time.

The reprehensible practice of fitting the hind shoes back on the foot so as to leave the toe of the hoof projecting beyond the shoe is to be condemned, for although it lessens the noise until the hoof again wears back to the shoe (which it does in a few days), the clicking noise recurs and the hoof is that much shorter, which adds to the trouble. So we see that in forging, as in other

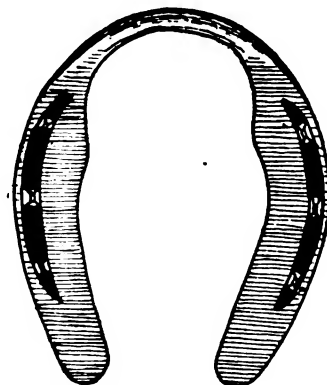


Fig. 3.—HEEL WEIGHT SHOE, WITH ROLLER MOTION TOE.

defects, the principal part of the cure is the discovery of the actual cause.

Treatment.

If your case is a young horse that has only just started to forge, and the shoeing is apparently perfect, then I would advise poulticing the front feet for a few days with warm, wet bran; if it be a confirmed case, ascertain if the front feet are free from corns, side bones or thrush. If there be nothing of this kind

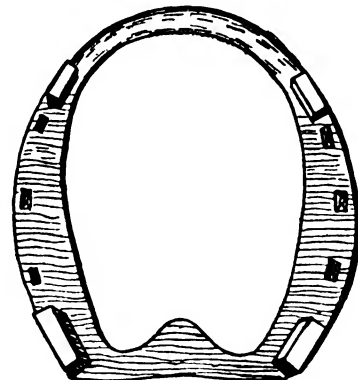
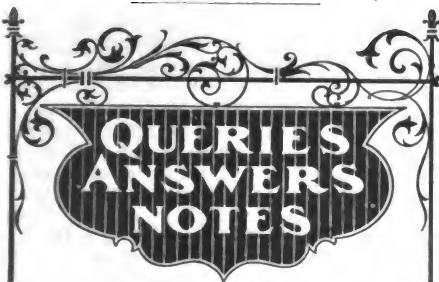


Fig. 4.—HEEL WEIGHT BAR-SHOE, WITH HALF ROUND ROLLER MOTION TOE.

to impede the action in front, then look to the shoeing; see if the hoofs are pared in conformity with the limb, if the horse has a naturally short pastern; don't

lower his heels as if he had a long, oblique one. If the toes of the front shoes are worn off while the heels are scarcely worn at all, it may be accepted as a sign that the heels of the hoof are too low. Again, some passing gaited trotters are made to forge by unlevel feet, which throws the horse off his balance, thus preventing the hind feet from passing outside of the front ones, as is natural to the passing gaited trotter. If the feet are properly balanced, then both sides of the foot will alight from or strike the ground at the same time; if one side of the hoof strikes the ground before the other, it is because the hoof is too high on that side. If the toes of the hind hoofs are worn short, shoe out to the normal length of the hoof, Fig. 2. If the old shoes are worn away at the outside toe or quarter, roll that part of the shoe. If there be no pain in the front feet or legs that you can discover and the hoofs are properly pared, then use the shoe shown in Fig. 3, in front. If there be some soreness in the heels from contraction, corns or thrush, then use a heel weight bar-shoe, Fig. 4, with leather, tar and oakum, and roll up the toe of the shoe, or shoe with a rubber pad. If, however, you find something to account for pain in the feet or legs, try to remove it, for if there be pain in a foot or leg (in a horse prone to forge) you cannot expect him to go clear until the cause is entirely removed.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

To Soften Cast Steel.—Will someone please advise me how to soften cast steel so you can drill it? CARL LEICHER.

To Temper a Square Punch Die.—Will some brother smith tell me how to temper a square punch die so that the temper will carry even? FRANK SHORT.

To Cure Knuckling.—Will some brother smith tell me how to shoe a knuckled horse, one that knuckles right over on the nigh fore-foot? GEO. McQUEEN.

Sharpening Toe Calks.—Will some brother smith tell me the best way to sharpen shoes at the toes? I find it very hard on the arms when I have to do a lot of this work. BERT COOPER.

Power Disc Sharpener.—I would like to know which is the best power disc sharpener and the name and address of such parties who manufacture this kind of machinery. AUGUST PERRES.

Tempering and Chilling Mould Boards.—Will someone tell me how to construct a refrigerator for tempering plow mould-boards, and what is the best liquid for chilling them in? J. O. CHURCH.

A Mare That Walks on Her Toes.—Will some brother smith tell me what to do with a mare that walks on her toes and when standing she does not touch the ground with the heel calks? A. W. CRIGLER.

Making Delivery Wagon Bodies.—Will someone please give me a few pointers on making delivery wagon bodies, the general principles, etc., and where I could get a book on such work? GEORGE E. BRIERLY.

Removing Galvanized Coating.—I would like to inquire of the readers of THE AMERICAN BLACKSMITH how to remove the galvanized coating from iron so as to make it easier to work and to weld. Can some craftsman tell me? WILLIAM HODGE.

Bel lows vs. Blowers.—In answer to Mr. Parsons regarding blowers, would say to him, get a cord of wood, saw half of it with a buck saw and the other half with a power driven saw and he will have a good illustration of which is the best. H. N. POPE.

Carriage Seats.—Will some good carriage maker tell me how to lay out a common carriage seat (such as the wagon maker is often called upon to make) and how to get the bevells for the corners? Kindly give some simple method as my head is pretty thick. BEGINNER.

Boiling Rims in Oil.—Will the boiling of wheels (i. e. the rims) in oil either before or after putting on the tire benefit the wheels or should the rims be soaked in cold oil to obtain best results? We mean flax seed oil. Let us hear the opinion of others. ALEXANDER SNIDER.

Handling a Poor Paying Customer.—Will some brother smith tell me how to handle a customer who runs a bill and is not worth anything except the horse he owns? Can I hold the horse at the shop for the whole bill if the work on the horse was done in past years? G. P. K.

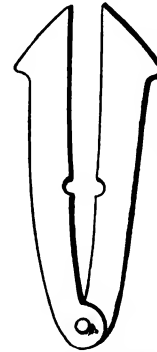
Shoeing for Stifle.—Will some brother craftsman give me his idea for shoeing and treating a horse that has been crippled in the stifle joint, to make him walk even and stand on both feet? Please give me a drawing of the proper shoe and just how it ought to be put on. B. F. FLEMING.

A Runaway Engine.—I have a 24-horse power gas engine which is a dandy, but sometimes it runs away. Can some one tell me, through THE AMERICAN BLACKSMITH, what is the matter and where the trouble lies? I have had my engine about six months and am not too well acquainted with it. A. E. THORNTON.

Tempering Oyster Knives.—Will some brother smith give me a recipe for tempering oyster-knife blades that are about four inches long, three-eighths of an inch wide and one-sixteenth inch thick, drawn down to a sharp point? They are made from Jessons cast steel and have to be tempered hard and tough. O. H. RIDGEWAY.

A Progressive Texas Shop.—Our shop is run by power. We have a 24-horsepower Challenge gasoline engine, and an emery stand for two stones. We have ordered a four-fire Canedy-Otto blower, one No. 14 Silver drill, and will also get a rip and cut-off saw, a hand saw and a trip hammer. I am in favor of power. D. G. MURPHREE.

Hammer Mending.—To mend a hammer broken in the eye, first make a clamp to fit each end of the hammer, then heat the hammer at the eye, as you would ordinary iron. Do not strike the hammer until you have taken the clamp off. Then make a punch to fit the eye, take a light heat on the hammer and smooth it up. Be very careful that you do not burn it. I have welded several in this way. E. B. NEWELL.



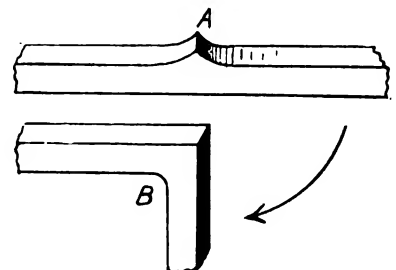
Vise or Clamp.—The sketch herewith shows a handy little vise or clamp to hold Neverslip calks while putting them on or taking them off of shoes. It is placed in a vise and the shoe turned round. The tool is made of tool steel and is creased inside. The engraving shows the vise open. This tool will also hold bolts and nuts. E. D. MARTIN.

To Make a Drill.—I have been a reader of THE AMERICAN BLACK-

A VISE OR CLAMP. SMITH for some time and enjoy its pages very much. I will give my way of making twisted drills, which may be of some help to my brother smiths. I take a piece of good steel, of the necessary size, and forge it out quite thin and a little wider than I want the finished bit to be. I then twist the piece regularly and pound the edges down lightly until it is the desired size. I make all my own bits, and find that they are very much better than the machine-made bits for cutting and strength. R. I. BRIDENSTEIN.

Bending Flat and Square Stock.—Not long since I had to bend a bar so as to make a square corner on the outside and a round corner on the inside of the bend. It took me all day to get it through my head and thinking it may save some brother craftsman a bit of trouble, I give my method here.

Take a piece of stock of the necessary size and fuller it as shown at A in the engraving. Then bend one end of it in the direction of the arrow and with a little



BENDING FLAT AND SQUARE STOCK.

forging and hammering you will have a corner iron as shown at B.

Regarding power in the shop, I want to say that it is the best thing that ever happened. We have a 24-horse power electric motor and find it just excellent. We can start it any minute and we use it to run the drilling machine, emery wheel and power blower. FRED J. HACKER.

Filling of Sarven Wheels.—By cutting the rivets after setting the tire your spokes settle to their proper place, then replace your rivets and remove your tire and you have as solid a wheel as when it came from the factory. But in case you file a place to pass the rivet and the tire should yet be loose there is nothing to keep the spokes from working loose, for you have filed out

their only support. If I only put one spoke in a Sarven wheel, I always cut the rivet, put in the spoke, set the tire and replace the rivet. I use a straight rivet and also a rivet set.

L. T. KOCH.

How to Prevent Clicking.—Place the toe calks of the hind shoe well forward and the heel calks a little lower than the toe. Then fit the shoe, allowing it to project out $\frac{1}{4}$ inch ahead of the hoof. I had a horse that in spite of all I could do would click very badly. As he was a very valuable horse, and the owner a good customer, it worried me a great deal. I read the above item in your paper and thought I would try it and when the owner came for his horse and saw the shoes he asked me if I had been drinking. I did not blame him either, for they did not look very inviting, but from that day, the horse has never clicked. Now I can put on a common shoe, calks all level, no toe clip, of course, and I have no trouble.

R. K. DICKIE.

Hooping a Tank.—A circular tank 20 feet 5 $\frac{1}{2}$ inches in diameter at bottom, 19 feet 5 $\frac{1}{2}$ inches in diameter at top and 14 feet 6 inches in height, is to be hooped with iron bands 6 inches by $\frac{1}{4}$ inch. The hoops are to be made in three sections or pieces with lapped and riveted joints. Do the hoops require to be beveled to fit the wood tight? If so, what bevel would be required and what plan would you consider to be the simplest?

J. F. SEMPLE.

In Answer.—The iron bands for your circular tank will have to be beveled, but as there is a difference of only one foot between the diameter of the top and that of the bottom the bevel would be very slight. It would be much easier to hoop your tank with round rods instead of flat bands. They would prove just as strong and could be made with one weld only, making less work. We do not think any advantage is to be gained by using flat stock for your hoops.

Regarding Canvas-Back Rubber Pads.—Is it possible to injure a horse's foot by using a canvas-back rubber pad with toe tips? I have been using them on my horses this winter and on some others. Horses seem to go nice in them and it looks as if they would be a benefit to them but it seems to injure the frog by making it soft and easily removed. Would like to see this taken up and discussed in the journal. Our roads are dirt, but are very hard this winter.

A BLACKSMITH.

A Michigan Letter.—I have noticed a great many letters from all over the United States, but a very few from Michigan. Last April we installed a gasoline engine. We run two emery wheels, a drill press, wood lathe; and sharpen plow points and lawn mowers. We find it a great deal better than running a horse power and much cheaper. We put a gallon of gasoline in the tank and kept account of the work. When the gallon was gone we had \$5.85 for the work done.

CLAUDE BAILEY.

The Best Tuyere Iron.—In answer to the question about the best tuyere iron, will say, the best I ever saw is the California tuyere iron. Take a 2 $\frac{1}{2}$ or 3-inch pipe long enough to reach from one side of the forge to the other and cut a slot in it about $\frac{1}{4}$ of an inch wide and 3 inches long, so it will come in the center of the forge. Now place this pipe in the hole made through your forge and attach your blast gate or bellows at the left end of the pipe, fitting a cork into the other end. When cinders bother you, pull the cork out and blow the pipe out clean and your fire will seem like a new one each time the pipe is so cleaned. Put the top of the pipe about 7 inches below the

top of the forge. Some use a cast iron protector around the pipe and also cut a slot in that. This style tuyere iron will last for years. Using this tuyere iron you can make a solid forge which will never get out of order and which is easily cleaned. This kink is not a new one to some smiths, but it was to me until I came to the coast.

M. SCHICHTL.

A Georgia Shop.—My shop is 20 by 40 feet with a blacksmith shop annex 12 by 14 feet, which, however, is too small. I do my own blacksmith and wood work. During odd times, I make wagons, and have no difficulty whatever in selling them at about factory price, that is, from \$27.50 to \$35.00 without the body. I also repair wheels and do a general line of repair work.

My tools consist of an Acme hand blower, a B. S. vise with 5 $\frac{1}{2}$ -inch jaw; a Reece screw plate; a Green River tire setter and a drill press, I also have a Little Giant hub boring machine; a Rapid Transit wood vise; a double-gear tire bender; a Peter Wright anvil; and a Reynold's tire bolting machine. With this machine I can take nuts off and set buggy wheels in about five minutes. I do not see how any man of the craft can afford to get on without one, for it has been worth ten times its cost to me during the past summer and fall, as in this vicinity it has been very dry and hot.

I have no power as yet. I started in business five years ago, being \$100 in debt. I have paid for all of the above without any help.

G. H. M.

An Interesting Letter from Maryland.—I run a country shop and do work of all kinds. My shop is 50 feet by 18 feet. I have no power, but have a tire shrinker, a tire bender, a tire bolting machine, a drill press, a patent blower and a set of stocks and dies. I shoe horses and do all kinds of repairing, and wheelwrighting. I find business especially good at this time and as I have been without a helper since the first of December it keeps me hustling all the time. My record for today is 85 horses. I cleared over six hundred dollars last year and expect to do better this year. A brief list of our prices here is as follows:

Horseshoeing, plain.....	\$1.00
Horseshoeing with toes.....	1.50
Old shoes, set.....	.65
New tires.....	4.00
Wagon tires.....	6.00
Buggy rims, each.....	1.00
Cutting buggy tires.....	.50
Cutting wagon and cart tires.....	.75
Cart bodies.....	5.00
Wagon bodies.....	5.00
Buggy bodies ironed.....	5.00
Building ox cart.....	\$30.00 to 35.00
Building sleighs.....	18.00 to 20.00
Buggy wheels, set.....	10.00 to 15.00
Wagon wheels, set.....	12.00 to 18.00
Buggy axle arms, short.....	5.00

ADAM T. WIBLE.

Some Indiana Prices.—I have been in business in Geneva for over eighteen years. I send you some of the prices that we get for our work here:

Plain shoeing.....	\$.75
Bar shoes.....	1.50
Toe weights.....	1.50
Side weights.....	1.25
One set 5-inch steel buggy tires.....	5.00
One set 1-inch tires.....	6.00
Wagon axle.....	3.00
One wagon tongue.....	2.00
One wagon bolster.....	2.00
Cutting down set of buggy wheels.....	7.00
Rimming one set of 3-inch wagon wheels.....	8.00
Laying a plow.....	2.50
Setting buggy tires.....	2.00
Neverslip shoes.....	3.00

Setting three-inch wagon tires, per set 3.00
Resetting old shoes..... 40

I run two fires and keep one helper and a woodworker the year around. We do a credit business, but collections for the year have been good. A. B. SHOEMAKER.

The Best Tuyere Iron.—In regard to Mr. F. E. Learned asking for the best tuyere iron, I will tell what we use in both of our fires. We took a 1 $\frac{1}{2}$ -inch iron axle-box and bored four $\frac{1}{4}$ -inch holes in about the middle of it. Then we took an old flue, fitted one end to the box and let the other end extend to the end of the fireplace. We then fitted a wooden plug at the free end so as not to let any air escape and fixed the fireplace around the box the same as a duck nest. Every morning we light the fire, we take the wooden plug out and blow whatever cinders that are inside. This tuyere will last a life-time; does not burn coal half as fast as any other and can be used equally well for both light or heavy work that comes to the shop.

AUGUST PERRES.

Dressing Cold Chisels.—In answer to Brother Jesse A. Dees' question as to the best way for dressing and hardening cold chisels would say, I find it best at all times to make a test of any new steel that comes to hand. To do this draw three chisels to as fine an edge as possible, working them at a good uniform heat, not too cold. There is more good steel spoiled from beating it too cold than there is by overheating it. Now with water at a temperature about 95 degrees or just so you can bear your hand in it, harden the chisels, clean with sand-stone or emery cloth, and draw to color desired. Now break off each tool, watching each fracture. It can readily be seen from this test which is the desired tool for the work on hand. A good thing for a tempering bath is to let about one inch of fish oil float on top of the water. This saves the steel from chilling.

C. H. RICHARDSON.

Repairing Sarven Patent Wheels.—The following is my method of repairing patent wheels. It may be of some help to younger craftsmen. I first cut the rivets, and remove them with a punch made of an old file. After taking the spokes out, I set them in glue for 24 or 48 hours, after which I cut them down. Now replace the rim and set the tire. In order to give good dish, will say a half inch if old, and not quite so much if new, and if the wheel is too full all around, cut out every other rivet and then remove spokes. Shape the spokes, if not ready fitted, and screw them in nicely. Bore holes for rivets and put them in by pairs, first at rivet, which leaves space for two more spokes. Now drive in the spokes and set in glue. After which replace the rim and set the tires tight. If done properly, this will prove a good method.

G. H. M.

Cutting Rivets in Wheels.—I have been running a repair shop for nineteen years, have filled a great many Sarven wheels of different sizes, and also put in one or two spokes in several hundred Sarven wheels. I have tried cutting rivets but must agree with H. K. Van Tine & Son in the October number. I have never had any trouble with a wheel which I have filled without cutting the rivets. But I have had to repair many wheels where the rivets had been cut to drive new spokes, and I usually found that way unsatisfactory. I do a great deal of woodwork, blacksmithing and painting, but prefer filling and tiring wheels to any other work in my line. I like to read THE AMERICAN BLACKSMITH, as its contents are helpful to the craft. I am in favor of a lien law, and like others have suffered for want of such a law. J. C. VAN STAVERN.

SUPERIOR Horse Rasps

The Best Yet

Best High-grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim,
which gives the user the advantage of a long stroke,
— and at the same time a rasp of medium weight. —

ASK YOUR DEALER FOR THEM

Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Feb. 1, 1906, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

$\frac{1}{2}$ in. round or square; Iron, \$2.80; Steel, \$2.90	
$\frac{3}{4}$ in. " " " 2.40 " 2.50	
$\frac{1}{2}$ in. " " " 2.20 " 2.30	

Flats—Bar and Band.

$\frac{1}{2}$ x 1 in., Iron.....\$2.30; Steel.....\$2.30	
$\frac{3}{4}$ x $1\frac{1}{2}$ in. " " 2.20; " 2.30	
$\frac{1}{2}$ x 1 in. " " 2.40; " 2.40	

Norway and Swedish Iron.

$\frac{1}{2}$ in., round or square..... \$4.90	
$\frac{3}{4}$ in., " " 4.50	
$\frac{1}{2}$ in., " " 4.80	
$\frac{3}{4}$ x 1 in..... 4.80	
$\frac{1}{2}$ x $1\frac{1}{2}$ in..... 4.20	

Horseshoe Iron.

For No. 1 shoe, $\frac{3}{4}$ x $\frac{1}{2}$ in..... \$2.50	
For No. 2 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in..... 2.50	
For No. 3 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in..... 2.50	
For No. 4 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in..... 2.50	

Toe Calk Steel.

$\frac{1}{2}$ x $\frac{3}{4}$ in. and larger..... \$3.00	
--	--

Spring Steel.

$\frac{1}{2}$ to $1\frac{1}{2}$ in. Rounds. Op. Hearth \$3.00, Crucible \$5.00	
$1\frac{1}{2}$ to 6 in. by No. 4 gauge to $\frac{1}{2}$ in. Flats " 8.00, " 5.00	

Carriage Bolts. (Net Price per Hundred).

$\frac{1}{2}$ x 2 in..... \$0.54	$\frac{3}{4}$ x $2\frac{1}{4}$ in..... \$0.82
$\frac{1}{2}$ x $2\frac{1}{4}$ in..... .58	$\frac{3}{4}$ x $3\frac{1}{2}$ in..... .96
$\frac{1}{2}$ x 3 in..... .62	$\frac{3}{4}$ x 4 in..... 1.81
$\frac{1}{2}$ x 4 in..... .65	$\frac{3}{4}$ x 4 in..... 1.70
$\frac{1}{2}$ x 6 in..... .75	$\frac{3}{4}$ x 6 in..... 2.10

PADDOCK-HAWLEY IRON CO.

Iron, Steel, Carriage and Heavy Hardware,
Trimnings and Wood Material. . . .

ST. LOUIS, MO.

CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,

PEORIA, ILL.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

BLACKSMITHS be Master Mechanics for one dollar. Valuable samples free. Send today.
W. M. TOY, Sidney, O.

FOR SALE—Blacksmith shop and tools. House and lot. Write for particulars.
MRS. LEO. HOLLENBACK, New Chicago, Mont.

WANTED—A first class blacksmith for ironing new light grocery wagons. Steady job. Good wages. **PETER M. ANDRIOT & SONS**, Louisville, Ky.

FOR SALE—Blacksmith shop with tools and dwelling. Good location. Write for particulars.
N. M. CHRISTENSEN, Shennington, Wis.

FOR SALE—Blacksmith shop, tools and dwelling. Good location. Write for particulars.
FRED DUVAL, Rome, Wis.

WANTED—A good all-round man. Must be specially good in horseshoeing. Write to
C. L. HIGGINBOTHAM, Seneca, Mo.

FOR SALE—A blacksmith shop 24 by 46 feet, living in the rear. Only shop in town. Address
A. ANDERSON, Forada, Minn.

FOR SALE—Blacksmith stock and tools, 10 H. P engine and all up-to-date machinery. Good trade. Plenty of work. For particulars address
AUGUST JOHNSON, Alcester, S. D.

I CAN SELL YOUR BLACKSMITHING BUSINESS (with or without real estate) no matter where it is or what it is worth. Send description, state price, and learn my wonderfully successful plan.
W. M. OSTRANDER,
109 North American Bldg., Philadelphia.



THE FOWLER NAIL COMPANY, SOLE MANUFACTURERS, SEYMOUR, CONNECTICUT.

New Books.

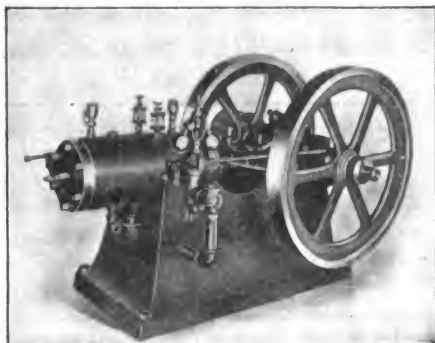
Worthy of special attention is the *Cyclopedia of Applied Electricity*, as published recently by the American School of Correspondence, at Chicago. It is a work in five volumes, each one being in itself a finished treatise on certain branches of the subject, and the five parts combining to form the most comprehensive work of its kind ever printed. Unlike other works on the vital subject of electricity, this *cyclopedia* is not written for the technical scholar who has made a thorough study of it, but on the other hand, it has been compiled with a view to the need- of the busy, practical man—the man whose perception of electricity is limited, and who at the same time wishing to increase his knowledge, cannot plunge as deeply into the subject as he desires. In fact, the work might be termed a complete guide for all those men who are interested in the practical applications of electricity.

The value of this publication may be judged from the list of authors and contributors. In this list are found some of the most prominent authorities on the several topics treated—scholars, teachers and college professors—all lending their aid to make the *cyclopedia* complete. At the same time, the text is written in most simple language, making it most valuable to the class for which it was printed. Besides this, the books are replete with illustrations and diagrams, making clear all doubtful points, and saving the reader much study of many complicated explanations. In the five volumes there are about 2,500 pages and over 3,000 illustrations.

The topics treated throughout the five parts range from the fundamental laws and principles of magnetism to the important problems which confront our able electrical scholars of to-day. As the whole work is especially designed as a text book, the closely related subjects are brought together under a number of general headings, and many practical examples are given in each branch. Each volume is also supplemented with a list of review questions by means of which the reader can test for himself the knowledge he has acquired on the subjects treated.

Trade, Literature and Notes.

THE ENGINE shown in the accompanying illustration, and also in the advertisement (page XXVIII) of the Robertson Manufacturing Co., Buffalo, N. Y., the manufacturers, is the result of many years of experimenting to construct an efficient engine which is not liable to give trouble. The construction is very simple. There are no valves whatever to get out of order. The cylinder is headed at both ends, as the charge is compressed at each end, with an impulse every revolution, giving the



engine a steady, uniform speed. Another feature of merit is that the piston operates from a cross-head, traveling on parallel steel guides, which insures a much longer wearing cylinder than when the piston connects directly to the crank. This

new construction is precisely the same as in a high-grade steam engine. The type of governor used permits a very sensitive control of the fuel, being operated as a throttle governor and allowing only the proper mixture of gas and air to enter the cylinder as required by the load. As it is entirely cut off by the movement of the piston in passing and closing ports in the cylinder, no leak or waste of fuel can occur, which insures great economy in operating. The igniter is of extremely simple construction, of the make and brake type. It operates positively from an eccentric on the crank shaft. The rod connecting the igniter is furnished with a R. L. coupling nut by which the speed may be changed at will while the engine is in operation. This engine is designed throughout with a view of furnishing a power at all times reliable, economical and durable. Further information may be had by addressing the makers.

THE WEST TIRE SETTER CO., Rochester, N. Y., recently supplied the Deering Works of the International Harvester Co., Chicago, Ill., with a special large power tire setter capable of handling tires eleven inches wide. This is the first machine ever put in use on tires of this width in the United States and is the third tire setting machine furnished the International people by the West Tire Setter Company.

THE PERFECT POWER HAMMER, as manufactured by the Macgowan and Finigan Foundry and Machine Co., of St. Louis, Mo., is claimed to be the simplest, most durable and most effective hammer manufactured. It is built in three sizes, designed to work iron up to two inches. The main frame is made in one heavy casting and the motion of the spring and head is in a direct vertical line, so as to diminish the strain on the guides and spring, thus increasing their durability. The

THE HELLFIRE ELECTRIC BLOWER

Direct-connected to General Electric Co. Motor

IS THE BEST

LOW
PRICE

PROMPT
DELIVERY



Write for descriptive circular and price list.

The Electric Blower Co.

141 South Clinton Street
Chicago, Ill.

hammer can be run at full speed with one horsepower. The height of the hammer is 6 feet 9 inches, occupying a floor space 20 by 30 inches. Full description will be sent upon application to the makers.

BALL BEARINGS

NOT
HERE

BUT HERE
BALL
BEARINGS

1905
Buffalo
Drill

With ball bearings
where they count.

What use are ball bearings if they are not in the RIGHT PLACE? We put them where the friction and wear come—between the drill spindle and the feed screw. No brass nut to wear loose.

They're under the fly-wheel, too. Made from tool steel, glass hardened, ground and polished.

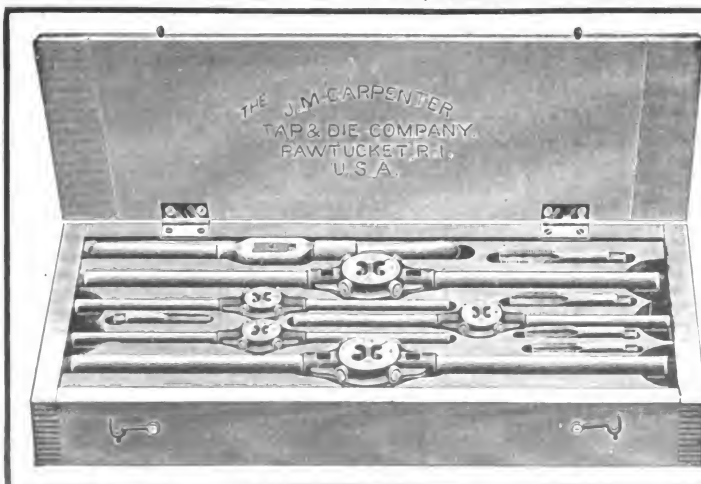
No. 90 DRILL
Patent applied for

Back gears thrown in without the use of tools. Automatic feed—two speeds.

For hand or power use.

Write for full description and prices to the

BUFFALO FORGE CO.
BUFFALO, N. Y.



CARPENTER'S New Full Mounted Sets

With a stock for each die and the Original Nichols Tap Wrench.

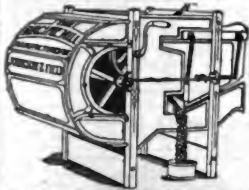
Before buying a die set you should see CARPENTER'S, and you will have no other make.

SEND FOR CATALOGUE

The J. M. Carpenter Tap & Die Co.

PAWTUCKET, R. I., U. S. A.

THIS FANNING MILL FREE



In order to introduce the celebrated "Racine" Mill in your locality and to repay you for your slight assistance, we will send you this perfect high-grade Mill, **ABSOLUTELY FREE.** The leader for 25 years. Lighter running, larger capacity, more perfect separation, greater strength, longer life and more uses than all others. Don't lose this chance. We pay freight 500 miles. Write today.

JOHNSON & FIELD MFG. CO., Dept. B, Racine, Wis.

A COMPLETE LINE OF

Carriage Tops and Trimmings

Seventeen different grades of tops. All good ones. Prices right.

Ask for No. 5 Catalogue

C. A. HALLIDAY, 24 Cedar St. Oneida, N. Y.

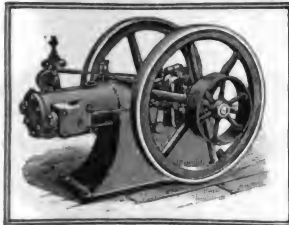


FODEN'S MECHANICAL TABLES

SAVE ALL FIGURING!

Tell at a glance how much stock to use for oval or elliptical hoops of any size, the circumferences of circles, weight of flat, square and round stock, and the weight and strength of ropes and chains

Should be in every progressive smith's hands. Bound very neatly in green cloth. Price, 60c. **AMERICAN BLACKSMITH COMPANY, Buffalo, N. Y.**



IT IS OUR PRIVILEGE TO OBJECT

To your purchasing an engine until you have given THE WATKINS a thorough examination, for we know that our engines will please you in every way, just as they have pleased thousands of others. We have a very interesting catalogue which we will be glad to send you upon request.

The Frank M. Watkins Mfg. Co., 537 Baymiller Street, CINCINNATI, OHIO.

"Union" Combination Self-Feed Rip and Cross-Cut Saw

(Almost a complete workshop in one machine.)

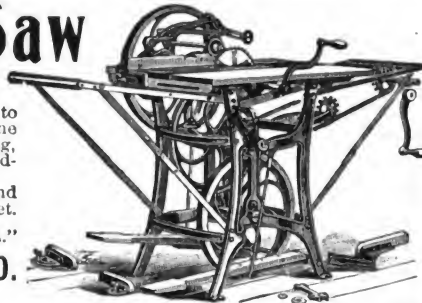
is suitable for various kinds of work:—ripping (up to 3 1/2" thick), cross-cutting, mitering, etc., and with the addition of extra attachments, rabbetting, grooving, gaining, dadoing, boring, scroll-sawing, edge-moulding, beading, etc.

The heaviest, most substantial, accurate and easiest running machine of its kind on the market.

Machines Sent on Trial. Send for Catalog "A."

THE SENECA FALLS MFG. CO.

274 Water Street, Seneca Falls, N. Y.



(87)

Don't Get Fooled Get Posted

GET IMPORTANT FACTS Concerning kerosene, gas and gasoline engines. Get our information of some forty different makes of engines in the past eight years before you buy, or you will be sorry. Do not invest your good money in an engine that is weak in any of these points. We know where they're sick, we know where they're weak, we know where they're lame, we have repaired them. Get posted before you buy. Will give you free for the asking, information worth many dollars to you. If you are a blacksmith you can understand this.

WRITE TODAY.

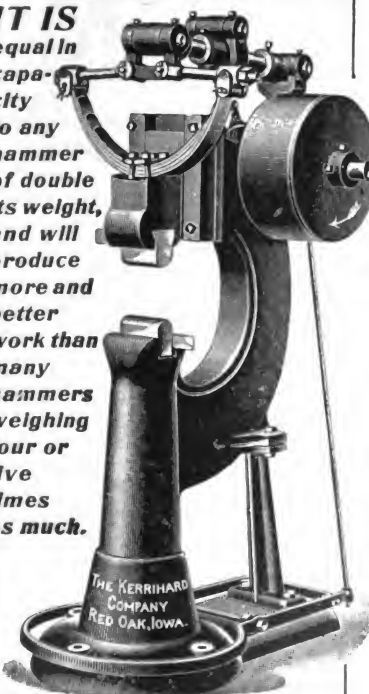
ENGINE REPAIRING AND TESTING WORKS,

8 to 14 Abbott St., Binghamton, N. Y.

Send for **FREE SAMPLE** of work done by

Kerrihard's Power Hammer

IT IS equal in capacity to any hammer of double its weight, and will produce more and better work than many hammers weighing four or five times as much.



It is a high grade machine at a price much lower than that asked by other makers. The design and construction are suited to withstand the strains of actual practice.

Ask your jobber if he handles it; and if not, why not.

Write for Circulars and Price

The Kerrihard Company

MANUFACTURERS

Red Oak, Ia., U. S. A.

Height over all - 55 inches
Floor space - 18x30 inches
Height to top of anvil block, 31 inches
Weight - 700 pounds



NOW

is the time to place your order for

STAR SHARES

EVERY ONE GUARANTEED.

Ask your jobber for them.

STAR MANUFACTURING CO.

Carpentersville, Ill.



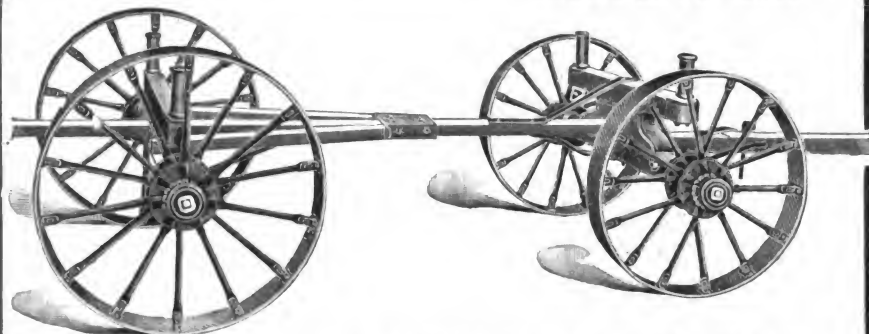
HONEST DEALINGS

Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

Our Wheels are Made of Steel Made to Fit Any Wagon

Our Wide Tired Wheels are substantially and thoroughly put up. Built in any width, for any load, to fit anybody's wagon. Every Blacksmith knows that farm wagons sell quicker when they have our wide tired, low down wheels. They save time and hard lifting and they make wagons haul easier, because they do not cut into road or turf.

Strongest and Most Durable.



We make wheels, gears, complete wagons and gasoline engine trucks, wood or steel axles (one or two horses.)

Write for our Catalogue and Net Prices. They will interest you. We are establishing an agent in each town. Ask for further particulars.

Geneva Metal Wheel Co., 15-25 Railroad Street, Geneva, Ohio.

"ALWAYS SHARP" CALKS

ARE THE BEST.
Interchangeable thread—6 sizes.

Marion, Ind., Jan. 20, 1905.
With 25 years' experience I consider your "Always Sharp" Calk the best adjustable calk I have ever seen. Wallace Lottridge, Statistician Master Horseshoer, Protective Association of Ind.

ALWAYS SHARP CALK CO.
Agents Wanted, SPRINGFIELD, MASS.



New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.



Write for circular and particulars.

942 W. Lake St. CHICAGO.

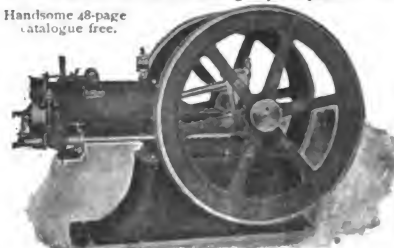
High Power at Low Cost

for fuel; quiet, smooth running, easy starting, the greatest reliability—that's what you get in

BADGER Gas and Gasoline ENGINES

Write at once for exclusive agency and prices.

Handsome 48-page catalogue free.



C. P. & J. LAUSON
101 W. WATER STREET, MILWAUKEE, WIS.

Buffalo Forge Co. HAND BLOWERS

Nos. 200 and 201

Simple, powerful and indestructible. Gears are extra heavy and run in oil. Three moving parts. No brass or bronze bearings to wear or run, throwing gears out of adjustment.

If you are the first in your county to order one of these blowers you get a tire upsetter free. Write for details.

GUARANTEE

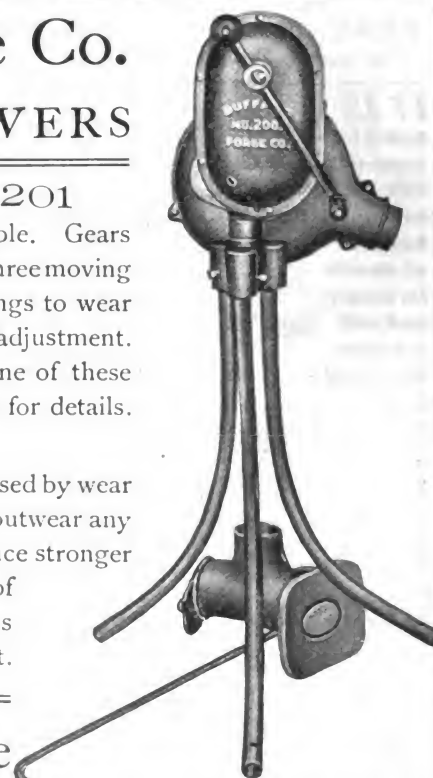
We will replace without charge any repairs caused by wear for five years. We guarantee this blower to outwear any other on the market. We guarantee it to produce stronger blasts with the same number of turns per minute and with less effort than any other blower built.

**Buffalo Forge
Company**

BUFFALO, N. Y.



BUFFALO BLOWER No. 200.
In this style crank turns as shown by arrow. Also made left handed on special order.



BUFFALO BLOWER No. 201.
This style Blower supplies blast by turning crank in either direction, but is not so efficient as the No. 200 design.

RELIANCE ENGINES

Sold on a 30-day
satisfactory
trial test

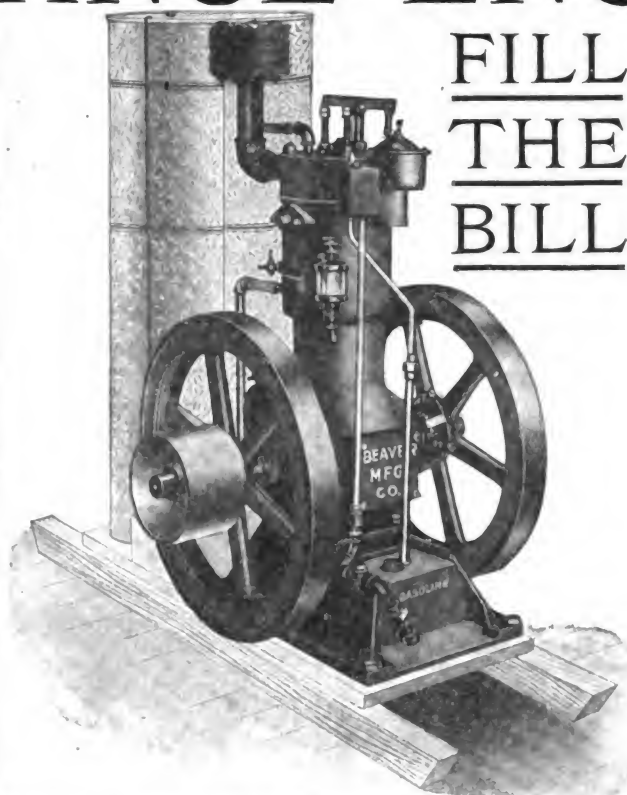
Guaranteed to do
exactly as rep-
resented

Catalogue No. 15 and
Prices gladly sent
upon request

Rochester, N. Y. Jan. 23, 1905.
BEAVER MFG. CO.
Milwaukee, Wis.

Gentlemen:—The 6 H. P. engine
that I purchased from you last
August is doing twice the work of
the 6 H. P. engine which I formerly
used at about one-third the cost.
It develops at least 2 H. P. more
than at what you rated it. It is
dust proof and this is especially a
good feature for my business (car-
pet cleaner). It starts any time
hot or cold and the only trouble I
have experienced was from poor
gasoline. Yours respectfully,

(Signed) THE F. H. ELTER,
CARPET CLEANING CO.
Rochester, N. Y.



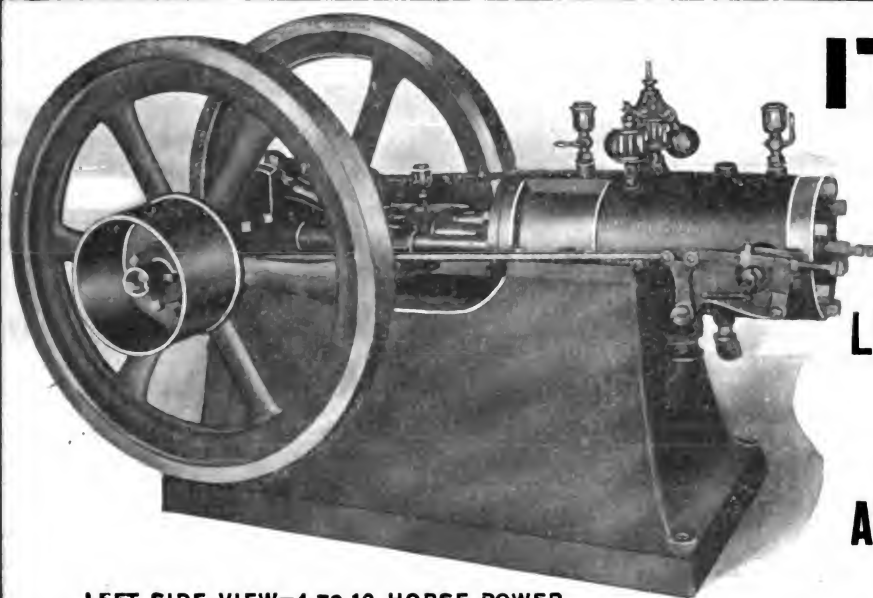
FILL
THE
BILL

THE BEST
THE SAFEST
EFFICIENT and
ECONOMICAL

Always Ready
Easy to Operate

Never Out of Order
Prices Reasonable

Beaver
Manufacturing
Company
Milwaukee, Wisconsin



LEFT SIDE VIEW—4 TO 10 HORSE POWER

IT CAN'T GO WRONG~

An engine with every trouble-
some feature eliminated.

LISTEN TO THIS:

Absolutely valveless. Not a
valve to get out of order in
the whole construction.

AND THIS:

Every working part (save the
straight line piston) is on the
outside, impossible to go
wrong.

SPECIAL 30-DAY OFFER = WE PAY \$100.00

To the First Purchaser
in every district, where we
are not now represented. We
have the most liberal offer
ever made on an engine. In-
vestigate it—it will pay you.

WE are only able to make this offer because we know that our latest
invention is the SIMPLEST, MOST PRACTICAL and MOST RELIABLE
engine ever offered to the trade. Every part a special feature.

THE ROBERTSON MANUFACTURING CO. High Class
See Descriptive Notice page XXIV. **BUFFALO, N. Y.** Engine Builders

HOTCHKISS CLIPPERS

Complete Line

Horse, Fetlock and Barber's Clippers

Specify for Hotchkiss Clippers. They are goods that will stand the test of time. Send for 1905 Catalogue.

EDWARD S. HOTCHKISS
WASHBURN ST., BRIDGEPORT, CONN.

Prompt attention from our Special Department for resharpening all makes of Clippers.

Simple in Design
Elegant in Finish



No. 40

B. B. Horse Clipper

Highest Quality and Workmanship Guaranteed

YOUR CHOICE

is here given you of five neat premiums in return for one new subscription to THE AMERICAN BLACKSMITH. Tell your brother smith how well you like the paper, send us his dollar, and get your choice of the premiums, free and sent postpaid.

WHICH ONE DO YOU WANT?

Remit by money order, stamps or registered letter. If you are not already a subscriber, send \$1.00 for a year's subscription and a premium.

American Blacksmith Co. — Box 974 — Buffalo, N. Y.

1. This hoof knife is made of refined crucible steel, carefully tempered. It is a high-grade, serviceable knife, with Heller Bros.' reputation back of it. Cut shows it about quarter size.



2. We offer as a premium a two line rubber stamp, with your name and address on it, accompanied with an inking pad, making a complete outfit. You will find use for it every day.



3. A handsome and reliable little pocket level like this would be of constant use to you. Nicely finished, 8½ inches long.



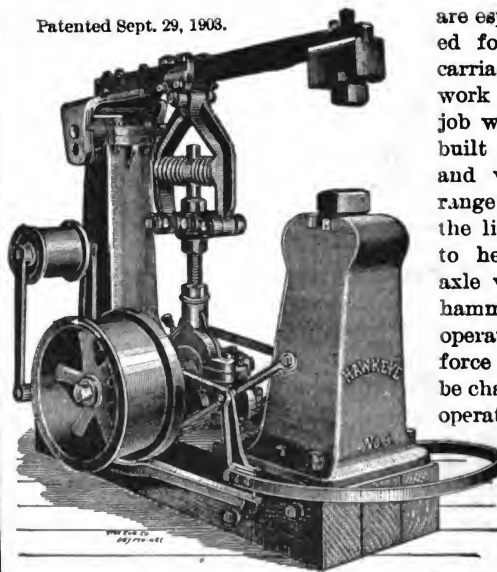
4. This Monkey-wrench in spite of being the size shown above, works just like a big wrench. The handle is of bone and the metal parts nickel-plated.



5. This miniature blacksmith hammer is neatly finished, and makes a splendid watch charm. Cut shows it full size.

THE HAWKEYE POWER HAMMERS

Patented Sept. 29, 1903.



are especially adapted for plow work, carriage and wagon work and general job work; they are built in two sizes and will handle a range of work from the lightest forging to heavy tire and axle welding. Our hammers are easy to operate and the force of blow can be changed while in operation.

For prices and description, address

Hawkeye Manufacturing, Co.
TAMA, IOWA.



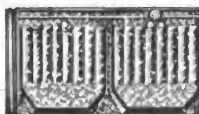
SPAVINOFF CURES

Spavin, Ringbone, Grease Heel, Sweeney, Windgall, Enlargements, Curb, Galls, Sores, Pollevis, Scratches, Shoe Bolls, &c. Removes unnatural growths and lameness, leaving flesh smooth and clean. Testimonials.

CHURCH BROS., AFTON, N. Y.

\$1.00 per Box, by Mail. For HORSES AND CATTLE.

METAL SHINGLE ROOFING...



With Montross Telescope Side-Locks is the best roofing in the world for house or barn. Storm proof. Easily applied. Catalogue, Prices and Testimonials free for the asking.

Montross Metal Shingle Co., CAMDEN, N. J.



At Last! We Have It!

A Labor and Money-Saving Device.

This new Punch and Shear is the neatest machine on the market. It will shear 3-16 x 3 in. flat and 3/8 in. round, and will punch a 5-16 in. hole in a 3-16 in. iron. It will pay you to investigate. Write us for information.

SPRENGER MACHINE WORKS,
10 Pearl St. Near Terrace, BUFFALO, N. Y.



SPECIFY

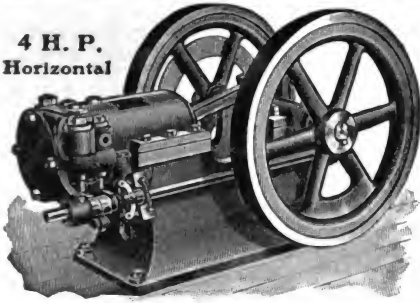
"MILTON" NUTS & WASHERS

MANUFACTURED BY
THE MILTON MANUFACTURING CO., MILTON, PENNA.



THEY ALWAYS GIVE
SATISFACTION.

THE PRICE WILL
INTEREST YOU.

LITTLE GIANT GAS & GASOLINE ENGINES**4 H. P.
Horizontal**

Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.

Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

**2½ H.P.
Vertical****Half a Man
Half a Salary**

The half-sized salary goes to the man who has but half developed his abilities. If you are earning but half what you need, we can qualify you for promotion in your present work or prepare you for a more congenial position and better salary. We are doing it right in your own district every day for others, to whom we can refer you.

The I. C. S. method of training by mail is the means by which thousands of ambitious people have been able to advance in salary and position. Many have risen from the lowest to the highest positions in their craft or calling. The accounts of the rise of some of our students read like romance.

Mark X before the position that interests you, fill in the coupon and send it to us. We will send full particulars.

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 1302, Scranton, Pa.

Please send me a free copy of "1001 Stories of Success," and explain how I can qualify for position before which I have marked X.

Mechanical Engineer	Bridge Engineer
Mechanical Draftsman	R. R. Construct'n Eng.
Machine Designer	Surveyor
Electrical Engineer	Mining Engineer
Municipal Engineer	Mine Superintendent
Chemist	Architect
Sheet-Metal Draftsman	Bookkeeper
Sanitary Engineer	Stenographer
Electrician	Ad. Writer
Stationary Engineer	French } With
Marine Engineer	German } Edison
Civil Engineer	Spanish } Phonograph

Name _____ Age _____

St. & No. _____

City _____ State _____

Fac-Simile Letters

—FOR—
Circularizing and Follow Up Systems

Look like the original and bring results. Furnished complete with names filled in or ribbons to match.

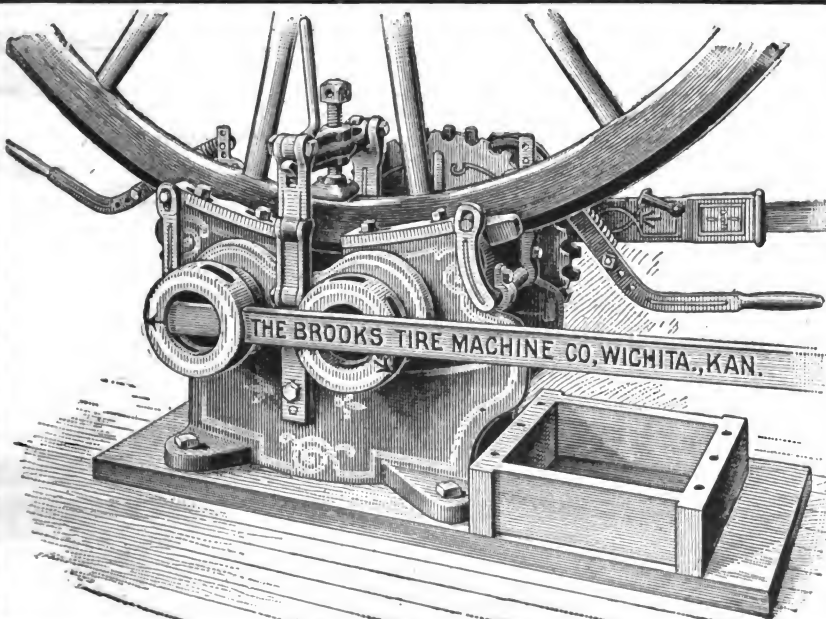
LERNER-BEAN CO.,
363 Washington St., BUFFALO, N. Y.

**The Highest Award of Merit
is the Approval of the Public**

Our Exhibit at St. Louis was awarded a medal by the Superior Jury of Awards of the Exposition, but we value more highly than prizes and medals the decision of the thousands of practical mechanics and users of vehicles who saw our machines in operation and gave it as their verdict that

THE BROOKS COLD TIRE SETTER

is far superior to all others in the principles of its construction, for durability and for rapid and accurate work in resetting vehicle tires cold.



If you have not seen one do not delay sending for full information with prices and special winter terms which will enable you to buy one with a small cash outlay. We ship them on trial and guarantee satisfaction to blacksmith and vehicle owner.

Some one in your locality will be using one next season and making large profits. Will it be you? A postal card will bring particulars.

The Brooks Tire Machine Co.
121 N. Water St., WICHITA, KAN.

THE EVERLASTING

TUBULAR STEEL DOUBLETREES SINGLETREES and NECK-YOKES

NO WAGON

OR TRUCK

COMPLETE

WITHOUT THEM

Pattern No. 56 A.

Equipped with
Forged Fittings

PITTSBURGH TUBULAR STEEL WHIFFLETREE COMPANY, - Pittsburgh, Pa.

Tap Snaps

Standard Pipe Taps

Fully Warranted

1, 18c.; 1, 25c.; 1, 33c.; 1, 38c.; 1, 50c.;
1, 65c.; 1, 85c.; 1, \$1.00; 2 \$1.25.

Pipe Reamers at Same Price

12 Machine Screw Taps, no two alike... \$0.75

(Assortments are put up. Can't change sizes.)

Any size Machine Screw Tap under

No. 14..... \$0.10

Standard Machinists' Plug Taps

1/4 x 32, 36 or 40; 1/2 x 24 or 32..... \$0.11

1/2 x 20 or 24; 3/4 x 20..... .15

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1/2 x 16; 3/4 x 18; 1/2 x 16..... .18

1/2 x 14; 3/4 x 14..... .20

1/2 x 12, 18 or 20; 3/4 x 12 or 18; 1/2 x 12, 1/2 x 11..... .25

1/2 x 11; 3/4 x 11; 1/2 x 10..... .30

1/2 x 10; 3/4 x 10; 1/2 x 9..... .40

1/2 x 8; 1/2 x 8..... .60

1/2 x 7; 1/2 x 7..... .75

1/2 x 6..... .90

1/2 x 6..... 1.00

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We have the following sizes in sets of 3 -

Taper, Plug and Bottom, at three times price

of plug taps alone.

1/2 x 20 1/2 x 18 1/2 x 16 1/2 x 14

1/2 x 12 1/2 x 12 1/2 x 11 1/2 x 11

1/2 x 10 1/2 x 10 1/2 x 9 1/2 x 9

1/2 x 8 1/2 x 7 1/2 x 6 1/2 x 6

1/2 x 5 1/2 x 5 1/2 x 5 2 x 4

1 set each 1/2, 3/4, 1, 1 1/2 and 1 3/4 Taps in

Hardwood Case..... \$2.75

15 Bicycle Taper Taps 1/2, 3/4, 1 and 1 1/4 in

Hardwood Case..... 2.75

16, 20, 24, 28 and 32 Thread. (Fine assort-

ment for odd jobs.)

Full line of 3/4 oversize Taper Taps to fit all

Standard Screw Plates.

1/2, 16c.; 3/4, 20c.; 1, 22c.; 1 1/4, 28c.; 1 3/4, 32c.;

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In ordering state thread wanted and make of plate

Taps for Never-Slip Toe Calks

1/2, 25c.; 3/4, 33c.; 1, 38c.; 1 1/4, 45c.; 1 3/4, 50c.

These taps have Reamer End and are strictly

first-class.

All Taps smaller than 3/4 in., mailed prepaid.

Will prepay postage or express on all sizes, 3/4 to

1 in. for 10% extra. Larger than 1 in. for 20%

extra, or for all orders over \$10, will deliver any-

where in U.S. within 500 miles, for 50 cts., within

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If you prefer, deposit price of goods with your

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ance of goods by you and we will send goods

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Western Tool Co.

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RUBBER RUNABOUT, \$35.00

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BUGGY

TOPS,

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Price, \$1.50 per set of 4 stks
Cash with order. Weight, 16 lbs.
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strength of our
STANDARD
compared to
the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we
guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of
the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by
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2. It is attached to bolster by means of two bolts passing through bolster
from the side, and one bolt from top to bottom of bolster, thus holding standard
perfectly solid, and at the same time straightening end of bolster, which in old
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3. The Malleable Iron Standard has a 3 1/2 in. face at base, which prevents
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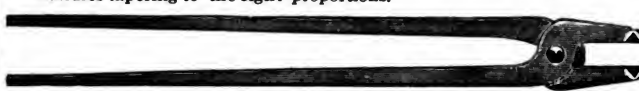
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Are drop-forged, without weld,
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They are smooth and uniform, with
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Will hold round, flat, square or oval
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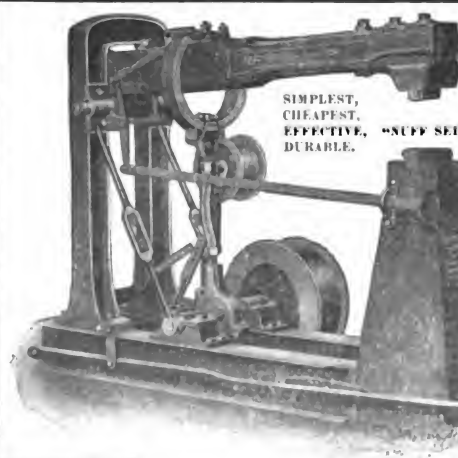
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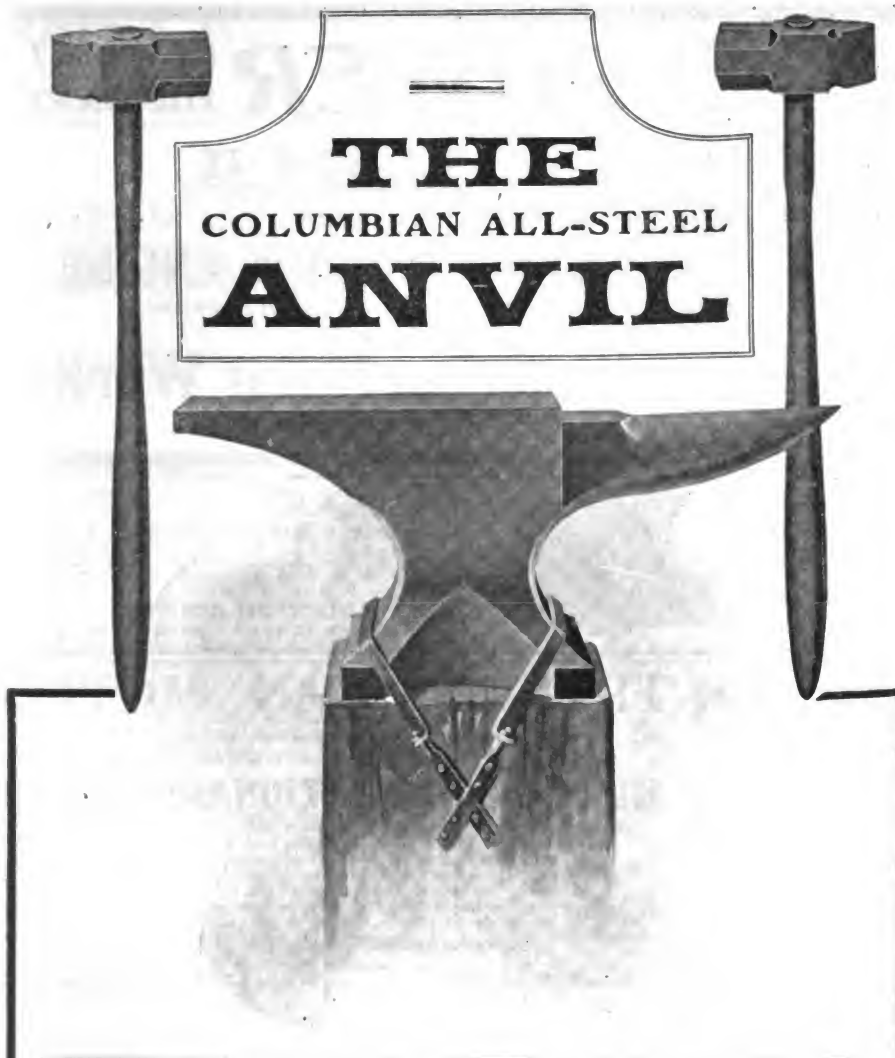


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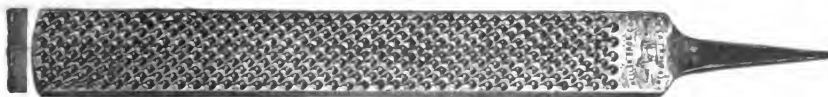
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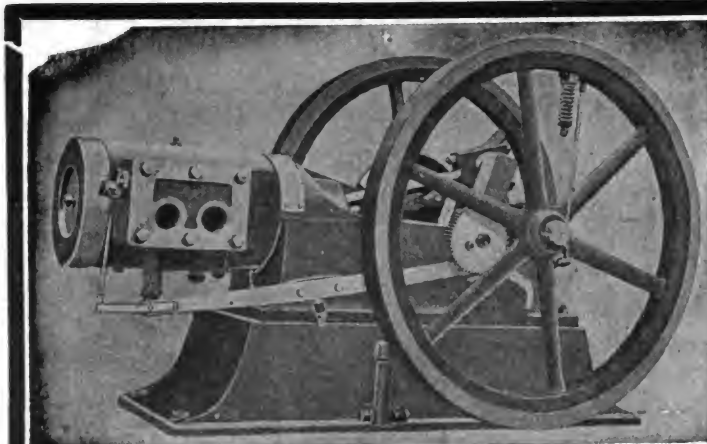
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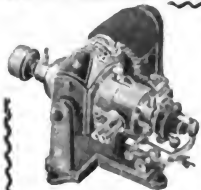
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Newton's Heave, Cough, Dis-
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**Motsinger
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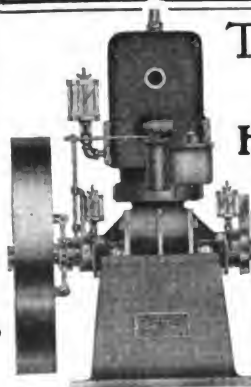


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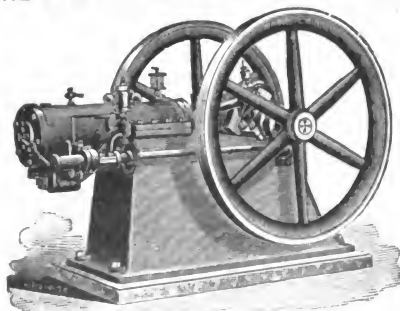
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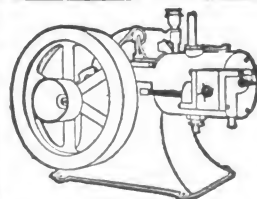
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Would you value the wisdom of the
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1/4 H. P. Gas Engine Castings for \$15.00 with blue prints, cylinder
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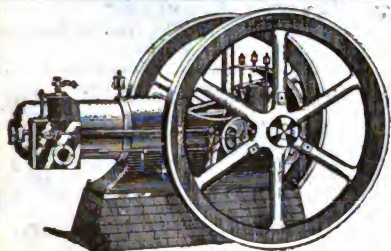
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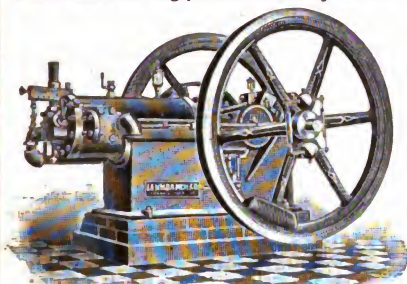
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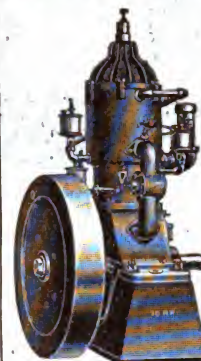
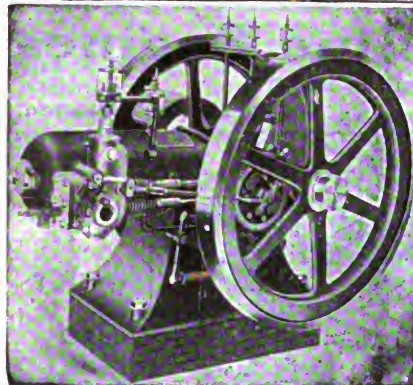
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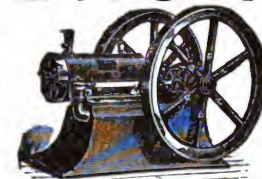
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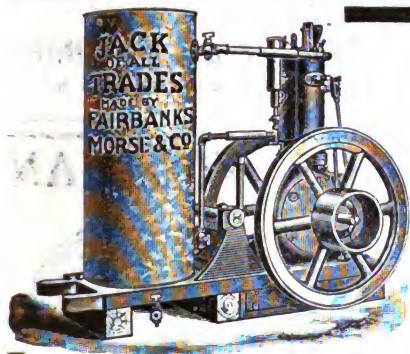
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Develops over 2 H. P. It costs very little.

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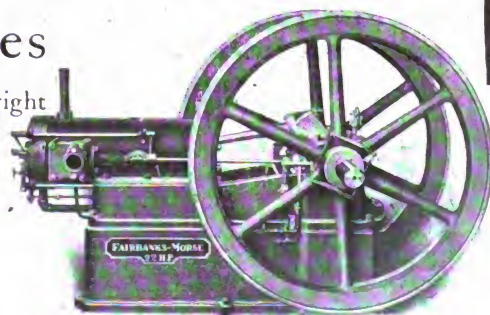
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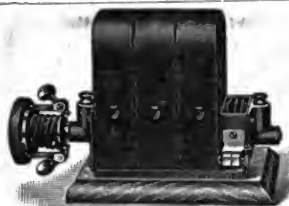
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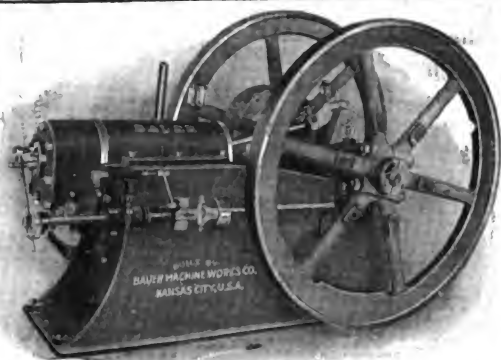
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The Acme of Simplicity and Perfection.

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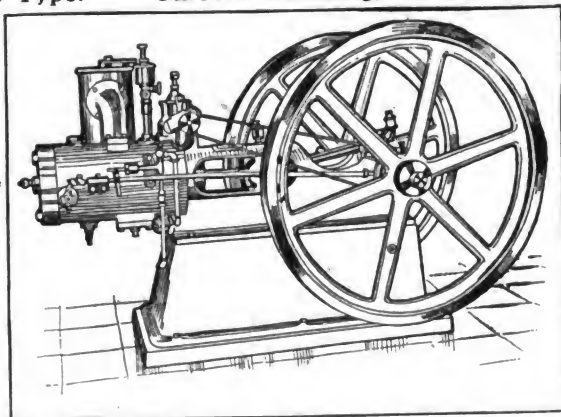
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SIMPLE, DURABLE, SAFE

Two Cycle Type.

Smooth Running, Practically No Vibration.

2
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30
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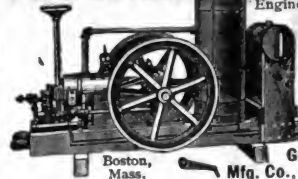
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SAVES HALF YOUR TROUBLES.
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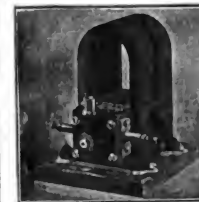
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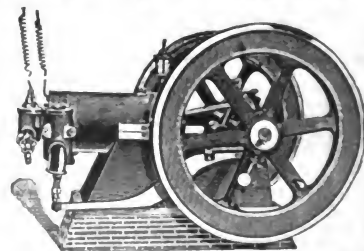
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Weber Gas and Gasoline Engines are the Best

They have just been awarded a GOLD MEDAL by the St. Louis World's Fair

This is simply one more testimonial to the perfect construction and superior running qualities of the Weber Engines.

WEBER ENGINES are best because

only the very best material and workmanship go into them. They stand the test of long, severe service.

Every engine is rigidly tested before leaving the shop. Anyone can operate a Weber Engine, they require but a few minutes' attention each day.

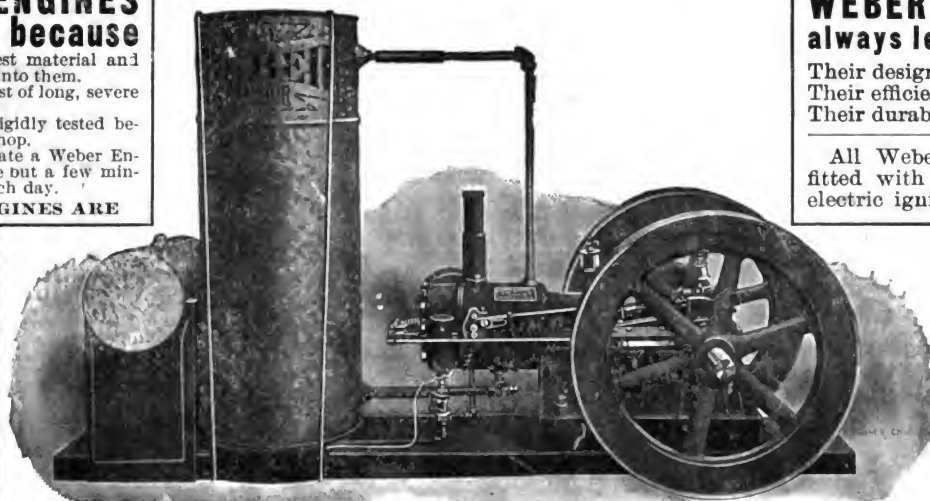
WEBER ENGINES ARE ABSOLUTELY SAFE

We build engines from $2\frac{1}{2}$ up to 300 horsepower.

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On all Weber Engines the speed can be regulated by the operator while the engine is in motion.

FUEL CONSUMPTION

is more important than the mere price of the engine

The fuel guarantee on Weber engines is lower than that made by any other responsible manufacturer

In actual service every engine we build will use less gasoline than we guarantee by ten per cent.

GUARANTEE

All Weber engines are guaranteed to be of the very best material and the very best workmanship, and we hereby agree to replace any part found defective f.o.b. our works without cost for a period of two years. We guarantee the consumption of fuel as noted below. We guarantee the speed to be steady and uniform. We guarantee that changes in temperature will not affect the engine's running. We guarantee interchangeability of parts. We guarantee that the Weber can be operated without constant regulation of the throttle valve.

Weber Engines operate on one-tenth of one gal. of gasoline per horsepower per hour.

Brantford, Conn.

Gentlemen:—Three and one-half years ago I bought a Weber Jr. engine and have used it continuously in my shop. While I bought it for a $2\frac{1}{2}$ H. P. engine it pulled over a 3 H. P. load when I first got it, and it still pulls 3 H. P. and over. As I have paid out only \$1.00 for repairs, and as the engine pulls as much now as when I first got it, over three years ago, you will see I did the right thing in getting an engine that was built to stay.

Yours truly,
JOHN DONNELLY.

Wilsey, Kansas.

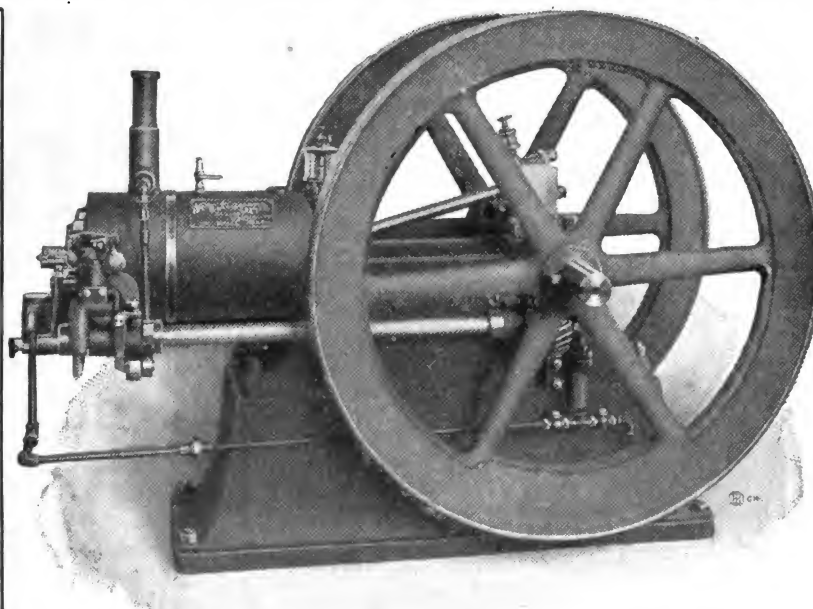
Dear Sirs:—Our Weber Jr. engine has run our blacksmith shop for the past four seasons and is doing better than ever, with absolutely no expense for repairs.

I. W. PIRTLE & CO.

Marengo, Iowa.

Gentlemen:—I bought a Weber Jr. engine over two years ago and it has proven to be a good machine. This engine has often been mistaken for a 4 H. P. and sometimes larger, by parties owning engines of other makes, when they see the amount of work this engine can do.

Yours truly,
J. M. WOODRUFF.



Five H. P. Weber Engine for blacksmith, wagon and repair shops.

Huntington, Pa.

Gentlemen:—The Weber Jr. engine purchased from you over two years ago has given very best results. I use the engine to run a pony planer and circular saw and it takes the place of two men, so you can see what a money and labor saver it is.

Every one should have a Weber Junior and their labors would be lessened and their trouble would cease.

J. E. ISENBERG.

San Bernardino, Calif.

Dear Sirs:—I have been running one of your Weber Jr. engines for over two years and it has given the very best of satisfaction. The engine runs a band saw, trip hammer, screw machine, blower, drill and emery wheel, and it will run any three of the above machines at the same time.

C. L. HUNT.

Dowagiac, Mich.

Gentlemen:—Over a year ago I bought one of your Weber Jr. engines and have never had occasion to write you since receiving the engine until now. I have given it a thorough test on all kinds of work and it is just as good now as when I bought it, but as I need another supply of hot tubes, I wish you would send me a dozen by mail.

Yours truly,
C. L. DOUGHERTY.

WEBER GAS AND GASOLINE ENGINE CO.

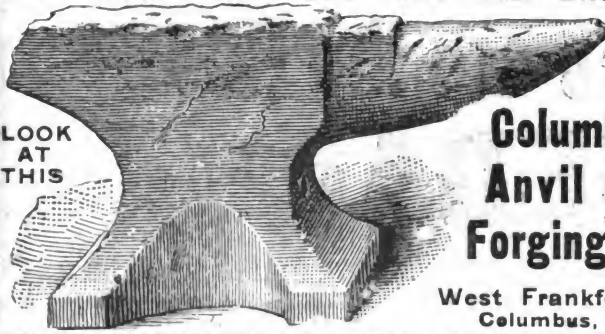
New York Offices, 115 Liberty St., N. Y. C.

KANSAS CITY, MO.

P. O. Box V. 1114

NO MATTER HOW BAD THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.

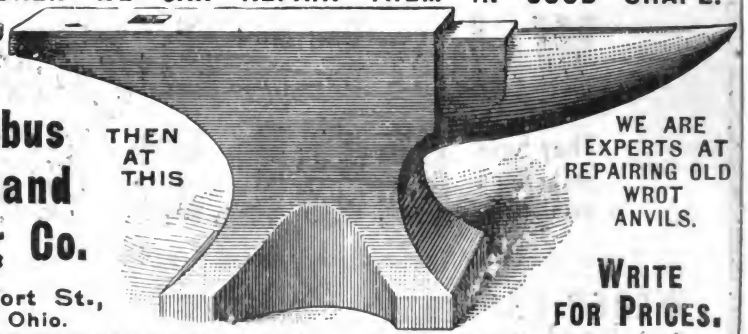
LOOK
AT
THIS



**Columbus
Anvil and
Forging Co.**

West Frankfort St.,
Columbus, Ohio.

THEN
AT
THIS



WE ARE
EXPERTS AT
REPAIRING OLD
WROT
ANVILS.

WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

ASK YOUR DEALER FOR THEM

LAWN MOWER GRINDING IS PROFITABLE

If Properly Equipped to do the Work.

One of my grinders enables its owner to practically control the Lawn Mowing Grinding of his town.

PRICES: \$75.00, \$150.00 and \$225.00.

C. R. Zacharias, Asbury Park, N. J.



Lathes and Drill Presses

Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

Catalogue M.

SHEPARD LATHE CO., 132 W. 2d St., Cincinnati, O.

EATON Letter Company

73 W. Eagle St., Buffalo, N. Y.

Ever Send Out circular letters to the TRADE? Our imitation typewritten letters absolutely cannot be distinguished from the real. They are the kind that get attention, that bring results. Send for free samples.

ONLY HIGH-GRADE WORK DONE.



Hinged Butt-Ring
The only loose piece.

BALL-BEARING AXLE

Sold strictly on its merits, fully guaranteed, and at the cost of a common axle.

Write us at once and you will be surprised.

See that Extension Screw.

The only axle to use on
R. F. D. Mail Wagons.



Standard Ball Axle Works Lancaster, Pa.

A Good Gear!



DESIGN GOOD.
MATERIAL GOOD.
WORKMANSHIP GOOD.
WE ONLY MAKE THE BEST.

O. M. Milk Wagon
Gear No. 251.

Our exhibits at Milwaukee and New York are right up to the minute. We lead always.

Our new catalogue shows sixty different styles of gears as well as our line of Surreys, Buggies, Road and Pleasure Wagons in the white; also all kinds of Bodies, Stick Seats, Tops, Trimmings. **IT'S FREE. Send for it.**

With our new buildings and increased capacity we will fill all orders promptly.

SCHUBERT BROS. GEAR CO., ONEIDA, N. Y.

THIS WRENCH IS MADE OF 50-POINT OPEN HEARTH DROP FORGED CARBON STEEL. JAWS WILL TAKE 1-4 TO 3-4 INCH PIPE.



PATENTED IN UNITED STATES, CANADA, FRANCE, GERMANY AND GREAT BRITAIN. PATENTS PENDING



5 IN 1
NUT
WRENCH

PIPE WRENCH, THREAD CUTTERS.
Will Remove "Neverslip" and "Rowe" Calks

The Best Wrench Made.

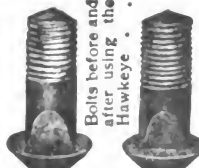
Best Wrench Made For Automobiles Has More Uses Than Any Wrench Made

No. 200 Regular
No. 400 same as No. 200 only full Nickel Plated

The dies in wrench for English and foreign trade, furnished with Whitworth style of thread, if wanted.

Manufactured by

THE HAWKEYE WRENCH CO., MARSHALLTOWN, IOWA, U. S. A.



Bolts before and after using the Hawkeye

This Wrench sells on sight. All that is necessary to sell it is to show it. Should be sold by all hardware stores, agricultural implement dealers and blacksmiths. It is now handled by all the leading hardware jobbers in this country.

Better order a dozen today.

TOOLS

FOR THE
HORSESHOER
AND
BLACKSMITH
IS OUR SPECIALTY



Electric Sharpening Hammer

FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

Champion Tool Co.
Meadville, Pa.



DON'T BE SATISFIED

with any old kind of a **Screw Plate**. Be up-to-date and get one of the Celebrated "**Reece**" Screw Plates,—the kind that have the **Adjustable Guide**—the kind that make **Perfect Threads at One Cut**—the kind that are Simplest, Easiest Cutting and Most Durable. That's the kind **Reece** makes, and if you want to do your threading **Cheaper, Quicker and Better**, then get a set of **Reece's Stocks, Taps and Dies**.

Satisfaction Guaranteed. Over **Fifty Assortments** to select from. We wish to place in the hands of every user of Taps and Dies, a copy of our **84 page Catalog**. Write us at once for this Catalog if you are interested.

SPECIAL OFFER.—For 85 cts. we will send to any address in United States, a **Fine Set of Bit Brace Nut Wrenches** for $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ " Square or Hexagon Nuts. Do not fail to avail yourself of this Special Offer.



THE E. F. REECE CO., GREENFIELD, MASS., U. S. A.

TOPS

SLEIGH BASKETS, ETC.

"Send for our 1905 catalogue just out. It will interest you from a pocket-book standpoint."

BALTIMORE BUGGY TOP CO.
1001-03 Argyle Avenue, Baltimore, Md.



STEEL STAMPS

Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, etc.

Geo. M. Ness, Jr.,
61 Fulton St., N. Y.

Price list sent upon application.



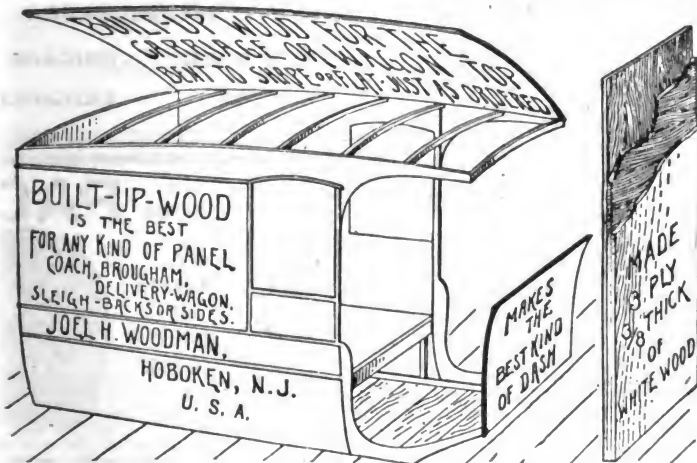
No Matter What You Want to File

- Notes —Docum'ts —Card Records
- Checks —Samples —Legal Blanks
- Letters —Invoices —Credit Reports
- Clippings —Reports —Deposit Tickets
- Papers —Books —Insurance Policies

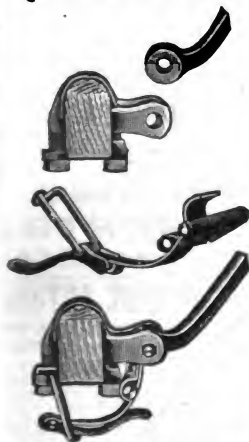
there is a **SHAW-WALKER** way to do it. And that way we **guarantee** is best and ask nothing but return of goods if after trial you do not think so

Check in the list above those items that interest you—tear out this advertisement and mail to us. That's the first step in simplifying your office or factory detail. And do it **NOW**.

The Shaw-Walker Co., Muskegon, Michigan



...IMPROVED...
FERNALD QUICK SHIFT.

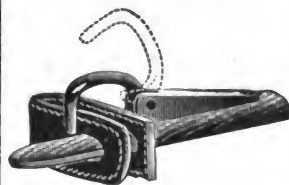


Patented June 18, 1899.
Dec. 22, 1903.
Canada, July 17, 1899.

502,272
Fernald Quick Shifters

Sold during
1904.

Patented Nov. 15, 1904.
FERNALD DOUBLE TRACE HOLDER.



The Fernald Double Trace Holder is

Something New

Sample Pair by
Mail... **25c**

FERNALD MFG. CO. NORTH EAST, PA.

"THE ONLY WAY"

BETWEEN
CHICAGO
ST. LOUIS
KANSAS CITY
AND
PEORIA

Handsomest, most luxurious trains in the world; completely rock-ballasted road-bed, no dust, no dirt, no smoke, no cinders.



THE ALTON'S 1905 GYPSY GIRL

Copyright, 1904, by the Chicago & Alton Railway Co.

Sequel to the famous "Fencing" and "Cow-Boy" Girl Art Calendars.

ART CALENDAR

FIVE SHEETS, EACH 10 X 15 INCHES
SEND 25 CTS.

with name of publication in which you read this advertisement, to GEO. J. CHARLTON, General Passenger Agent, Chicago & Alton Railway, Lock Box 618, CHICAGO, ILL., and get the handsomest calendar of the year. Four graceful poses in colors, unmarred by advertisements and ready for framing.

1	THE L. S. STARRETT CO.,	ATHOL, MASS.	U. S. A.	13	14
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2 feet long, 1/4 inches wide, folding in middle. Made of Best Quality Spring Tempered Steel.

BLACKSMITHS Will find this Steel Rule just what they need. We send it post-paid for 50 cents.

Catalogue of Fine Tools Free.

The L. S. STARRETT CO.
ATHOL, MASS., U. S. A.

Hausauer, Son & Jones

PRINTERS, ENGRAVERS
BOOKMAKERS

253-257 Ellicott Street, Buffalo, N. Y.

Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals, and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : .

Hand Forged Butcher Knives

Ground, Tempered, and all ready for the handles, either round or riveted, for 15 cents each or \$1.50 a dozen. All sizes from 5-inch to 8-inch. These blades are made from Sanderson Steel and warranted. Will replace any imperfect knife with two new ones. Handles all ready to put on, one cent each. Hand Forged Razors, ready to use, 40c. each; Pocket Knife Handles, in great variety, 10c. Try a sample. Hundreds of Smiths are using these blades and make money and friends selling them. Liberal discount in quantities. Address

WOODWORTH KNIFE WORKS, - NUNDA, N. Y.
ESTABLISHED IN 1876.

TIRE SHRINKER **TIRE BENDER**

FOR PROGRESSIVE BLACKSMITHS

IDEAL

WRITE FOR DESCRIPTIVE CIRCULARS THE WEYBURN CO. ROCKFORD, ILL. U. S. A.

IDEAL

PLOW SHARE AND OTHER STEEL SHAPES. BLAKESLEY TUVRE IRON.

THE "BUSH" Low-down Handy Wagon

WITH 4-IN. TIRE STEEL WHEELS



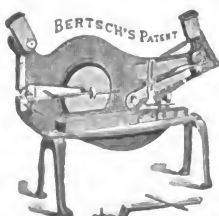
We make any size wheels to fit any skein.

WRITE TO **C. BUSH,**
QUINCY, ILL.
(MENTION THIS PAPER.)

RUBBER STAMPS
STEEL STAMPS
AND STENCILS

SEND FOR CATALOGUE.

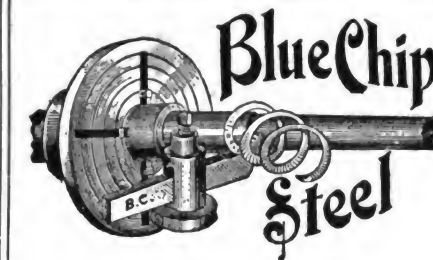
A. C. GIBSON CO.,
338-340
WASHINGTON STREET
BUFFALO, N. Y.



We Manufacture SHEARS AND PUNCHES

Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.

BERTSCH & CO.
Cambridge City, Ind.



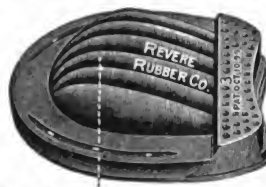
Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.
PITTSBURGH.

Selling Agencies:

NEW YORK **CHICAGO**
BOSTON **PHILADELPHIA**

AIR CUSHION RUBBER HORSESHOE PADS



See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS
NO SLIPPING
CHEAPEST AND BEST



Medium Canvas Back

REVERE RUBBER CO.

Sole Manufacturers **BOSTON, MASS.**

ATTENTION!!

We want you to represent us in your locality, selling

The Victory Corn and Feed Mills.

OLDEST AND BEST
GRINDING MILL MADE.

STRONG,
SIMPLE,
DURABLE.

Especially adapted to grinding ear corn, shelled corn, wheat, oats, rye, etc.

WRITE FOR PRICES AND PARTICULARS TODAY.

THOMAS ROBERTS.
(Established 1876.) **Springfield, Ohio.**

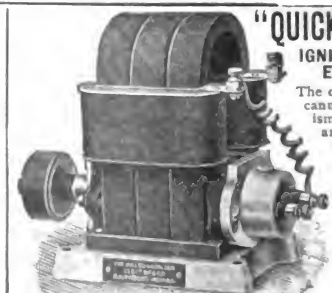
Bolster Springs

ALSO WAGON SEAT,
TRUCK AND PLATFORM SPRINGS



Sold by leading Jobbers, or write us

HARVEY SPRING CO.
RACINE JUNCTION, WIS.



"QUICK ACTION"

IGNITING DYNAMOS
Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

The **Knoblock-Heideman Mfg. Co.,**
SOUTH BEND, IND.

ROOTS'

Acme Hand Blower

For Blacksmiths

It has the unqualified
indorsement of
every mechanic who
has used it.



Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

Any smith can now renew the bronze bearings in the new Blower in a very few minutes.

Net price with box and connecting pipe for tuyere

\$15.50.

Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
The Leader of Blowers for Blacksmiths.

P. H. & F. M. ROOTS CO.

New York Office:
120-122 Liberty Street

Connersville, Indiana

Chicago Office:
1547 Marquette Building



DEFIANCE BAND SAWS

Substantial and durable. The latest improvements. Wheels furnished with cold-rolled spokes, far superior to a cast-spoke wheel. Unequalled for wagon, wood and repair shops.

**SIDNEY TOOL
COMPANY**
SIDNEY, OHIO

"BRAKE BLOCKS"

With a Record of

SEVENTEEN YEARS

WARRANTED SATISFACTORY ON EITHER STEEL OR RUBBER TIRE.

FACSIMILE TESTIMONIAL LETTERS AND ILLUSTRATED CATALOGUES.

THE MORGAN POTTER COMPANY,
FISHKILL-ON-HUDSON, N. Y., U. S. A.

In one Shop you find

A Bellows

in another

**A Buffalo Geared
Blower**

Which is Up-to-Date?



The
**Blacksmith's
Friends**



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

Welds at a low heat, does not fly. Saves time and fuel. Guaranteed to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

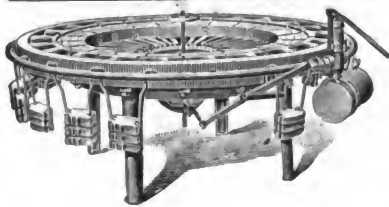
Pass all arguments on other brands of welding compound until you have tried the Banner Brands.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

INVESTIGATE

The Hercules Hydraulic



Before
You
Buy a
Tire Setter

National Machine Co.
KEOKUK, IA.

WRITE FOR
THE

Tire Setter News

It will tell you
all about Henderson
Tire Setters.

Write for information
about our new HYDRAU-
LIC SIDE GRIP machine.
Illustration not out yet.



Standard Tire Setter Co.
KEOKUK, IA.

HAY-BUDDEN

SOLID
WROUGHT

ANVILS

The Gold Medal Anvil
Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

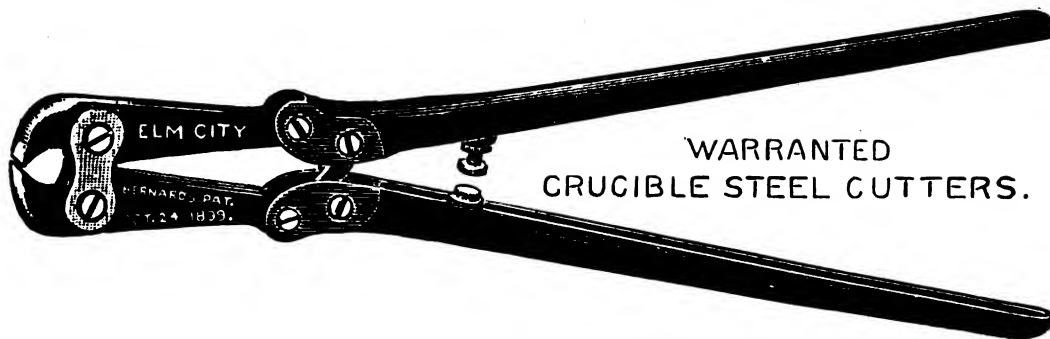
A Practical Journal of Blacksmithing and Wagonmaking

MARCH, 1905

\$1.00 A YEAR
10¢ A COPY

A Practical Tool of New Design

is the "Elm City" End Cutting Bolt Clipper

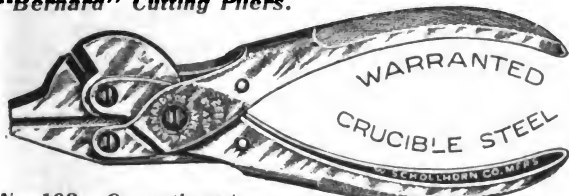


WARRANTED
CRUCIBLE STEEL CUTTERS.

No. 1. 24 inches long, weighs 4½ lbs., and cuts bolts ¾-in. diameter.

All Parts interchangeable; constructed on modern principles and embracing new and valuable features. Especially adapted to the use of Blacksmiths and Wagon Builders.

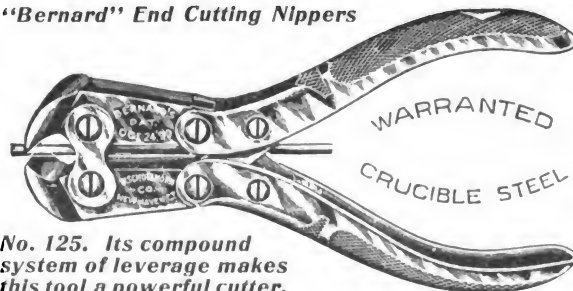
"Bernard" Cutting Pliers.



No. 102. Open throat, parallel jaws. Full nickel plated. Grips like a vise.

THE Pliers, Nippers, Punches, etc., made by the Wm. Schollhorn Company are guaranteed to contain material and workmanship of the very best quality.

"Bernard" End Cutting Nippers



No. 125. Its compound system of leverage makes this tool a powerful cutter.

WE Manufacture a Complete Line of Pliers and Cutting Nippers for all purposes.

WRITE for our Complete Catalogue and Price List.

THE WM. SCHOLLHORN COMPANY

NEW HAVEN, CONN., U. S. A.

CARRIAGE MAKER and BLACKSMITH TOOLS

THE "ELITE" BLOWER

is correctly manufactured
and is designed to
meet the demands of
hard service, together
with the greatest
possible efficiency,
durability
and convenience.

IT'S A
MONEY
MAKER.



Fig. 800, 12 inch.

Manufactured by

THE
SILVER MFG. CO.

365 BROADWAY
SALEM, OHIO
U. S. A.

Hub Boxing Machines, Spoke Tenon Machines, Band Saws, sizes 20, 26, 32 and 36 inch, Forges, and a complete line of hand and light Power Drills, a 19-inch Post Drill and a 20-inch Round or Square Base Drill with Lever or Screw Feed. The last two drills are used extensively by Carriage Builders and others.

THESE ARTICLES
ARE
GUARANTEED
AS
REPRESENTED.

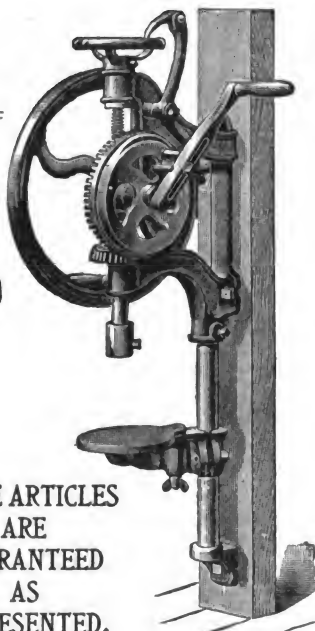


Fig. 731, No. 1.

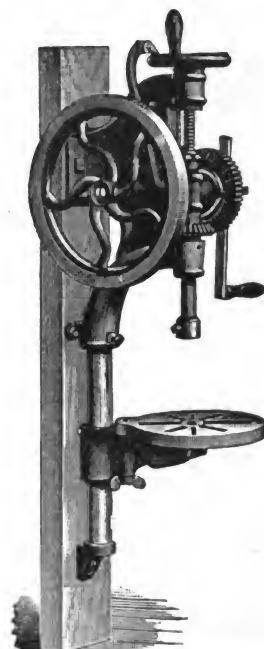


Fig. 742, No. 12.

Special prices are extended to Carriage Makers and Smiths
if this paper is mentioned.

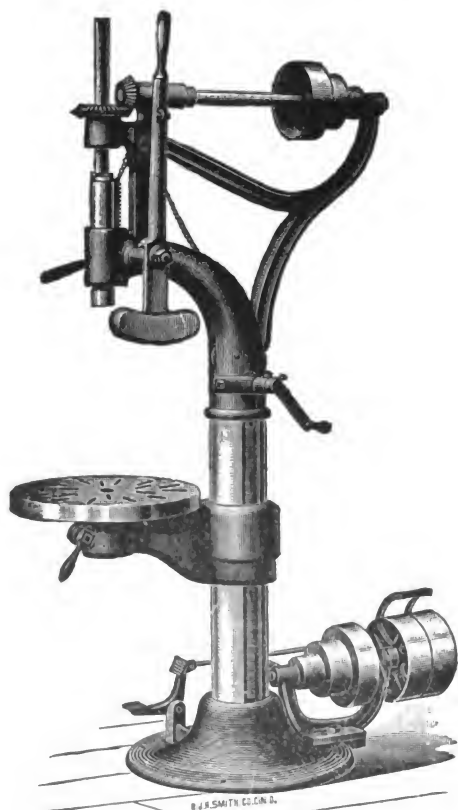


Fig. 850, 20 inch.

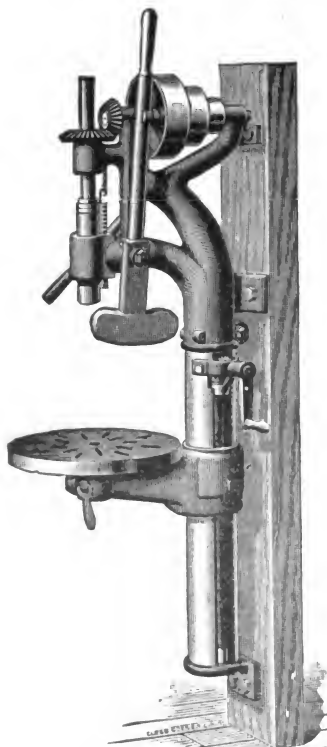


Fig. 727, 19 inch.

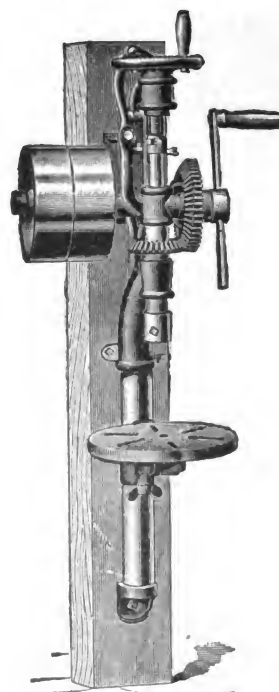


Fig. 746, No. 12.



GEO. H. CRAY.

E. D. CRAY.

CRAY BROTHERS

IRON AND STEEL

Carriage and Wagon Hardware, Wood Work, Trimmings, Tools,
HORSESHOERS' SUPPLIES

57 AND 59 WATER STREET,

Cleveland, O. March 1st, 1905

The "American Blacksmith" Co.,
Buffalo, N. Y.

Gentlemen:-

We expect to mail our 1905 NET PRICE CATALOGUE March 15th. It is full of interesting prices and the latest in carriage materials and up-to-date tools and machines. Tell any of your subscribers that do not receive a copy, to write us for one, as it is free to the trade and sent to them only.

One customer says that its use has saved him several hundred dollars.

C-F

Yours truly,

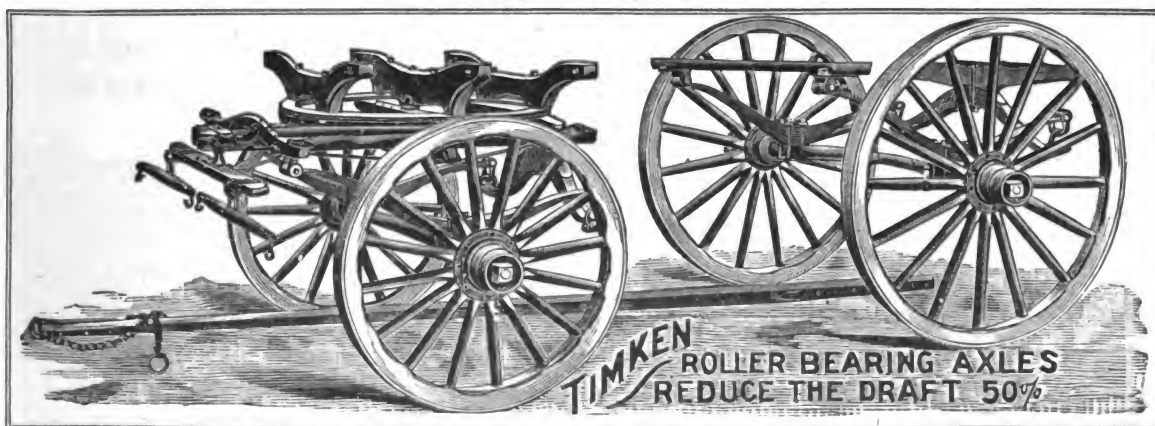
Cray Brothers.

EXPERIENCE COUNTS

We have had 20 Yrs. of It
In the Manufacture of

GEARS AND WAGONS OF ALL KINDS

That's Why **Selle Gears** are **Unsurpassable** and **Why You Should**
TAKE NO OTHER



Look for the Name SELLE on Every Gear.
1,000 Styles and Sizes—COMPLETE CATALOGUE FREE

THE AKRON-SELLE COMPANY

AKRON, OHIO.

CAPEWELL HORSE NAILS IN RUSSIA



THE ABOVE IS A PHOTOGRAPH OF THE EMPLOYEES IN A BLACKSMITH SHOP
IN ST. PETERSBURG, RUSSIA, WHERE CAPEWELL HORSE NAILS ARE USED

Made by **The Capewell Horse Nail Company**
HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World

.BRANCHES

New York: 103 Beekman St.
Philadelphia: 323 Arch St.
Baltimore: 326 North Gay St.
Buffalo: 11 Ellicott St.
Cincinnati: 720 Main St.
Detroit: 29-31 Farrar St.
Mexico City: Cinco de Mayo, 76.

Chicago: 238-240 Randolph St.
St. Louis: 12-14 North 12th St.
New Orleans: 736 Union St.
Denver: 1530 16th St.
San Francisco: 636 Mission St.
Portland: 554 Worcester Block.
Toronto, Can.: 73 Adelaide St. East.

1905 Calendar and Complete Catalogue Free on Application.



BUY THE BEST

Ask your dealer to show you

**THE
TRENTON**

"It rings like a bell"

Manufactured by **THE COLUMBUS FORGE & IRON CO.,** Columbus, O.

Sole Sale Agent **HERMANN BOKER & COMPANY,**
101 Duane Street, New York City.

AN AXLE

*Which is coming into favor
again is here illustrated, the*



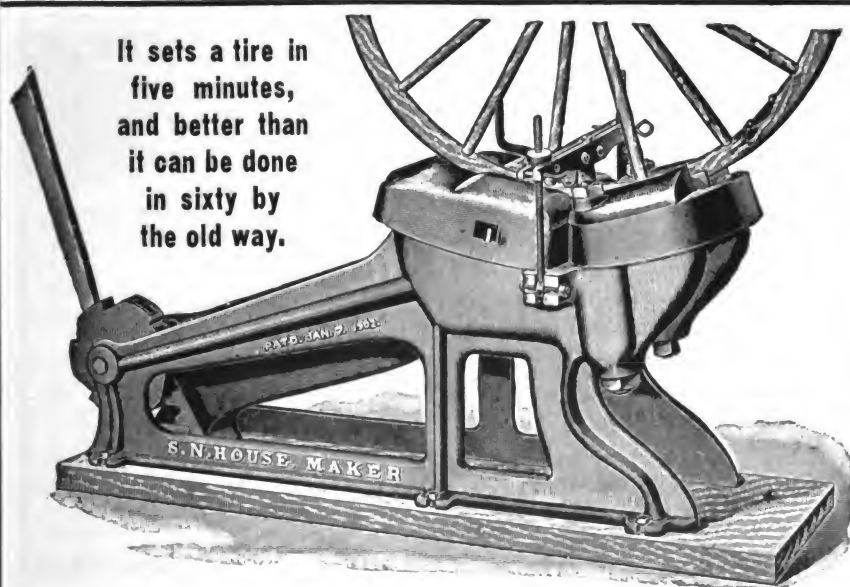
**Stivers
Long Swell**

We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

*If you wish further particulars
Write to the*

DALZELL AXLE CO.,
South Egremont, Mass.

THE HOUSE COLD TIRE SETTER



It sets a tire in
five minutes,
and better than
it can be done
in sixty by
the old way.

won the highest prize at the great World's Fair, but it has won a greater victory in the field. There are more of them in practical use today than of all other cold tire setters put together, and they are in use in every State in the Union. Ask your neighbor about it or write for catalogue.

Read what these two men say. We have a thousand more customers just as well pleased as these.

W. C. GUNLOCK, Victoria, Texas, says, after having used the House Cold Tire Setter for four years and set several thousand tires with it, that "it will do everything claimed for it and more, too. From four to seven minutes is all the time it takes to set a tire."

S. D. HAFLEY, Spring Creek, Pa., says: "The House Cold Tire Setter is all right. It has drawn me trade for ten miles, past three other shops. It is a sure trade winner. As long as I remain in the business I do not want to be without one, for it makes the hardest hottest work I had the easiest. The best record for speed I have made is two tires in three minutes."

HOUSE COLD TIRE SETTER COMPANY

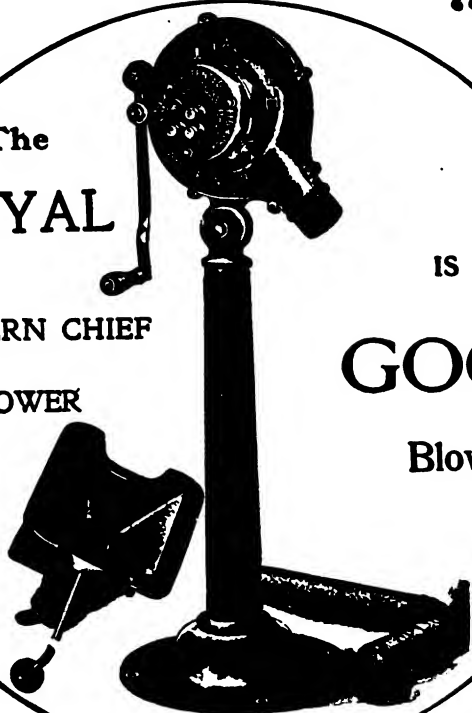
OFFICE AND FACTORY, 216, 218 AND 220 SOUTH THIRD STREET, ST. LOUIS, MO.

THREE GOOD THINGS

"ASK THE DEALER."

The
ROYAL
WESTERN CHIEF
BLOWER

IS A
GOOD
Blower



ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.

Gears and Boxes are phosphor bronze and steel.

No spiral or worm gears.

Fan, 12 inches. Weight, 100 lbs.

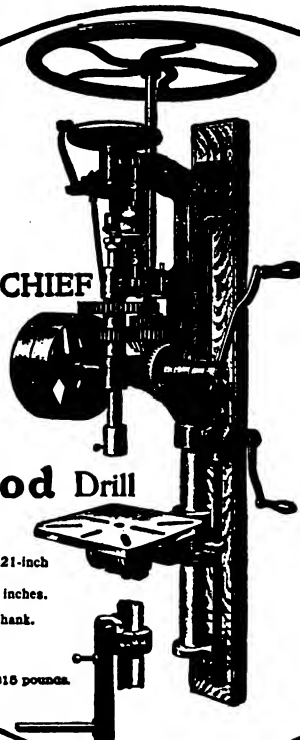
Fire-pot measures 9x11½x4 in. inside.

No. 14 DRILL

This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.

THE
WESTERN CHIEF
DRILL

No. 14
Is a Good Drill



It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table

Drills to center of 21-inch Circle.
Bores from 0 to 1½ inches.
Takes Bits ¼ or ⅝ Shank.

Weight, 315 pounds.

The
Royal

No. 100

Forge

Is a
Good

Forge



Hearth, 33½x46 inches.
Fan, 12 inches.
Height, 50 inches.
Weight, 275 pounds.
Length over all, 64 inches.

No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

THE HOLD FAST SHAFT COUPLER

Fits any bolt or lug from 7-16 to 3-16 inches in diameter. No bushings of any kind required. Takes up its own wear. One hand the only tool required to operate it. Quick as a Wink. Silent as the Grave. All parts, except spring, drop forged from bar STEEL. Crucible STEEL Spring, oil tempered and thoroughly tested. Workmanship, the Best. Nothing cheap about it but the price. STEEL'S the stuff, NO MALLEABLE IRON in the Holdfast. Made to outwear any vehicle to which it is attached. It will do it, too. Made "a little better than seems necessary." The Holdfast has the well-known BRADLEY quality, the ALL RIGHT brand. If you are interested write for prices or order a sample pair.

PATENTED:
April 3, 1900.
Sept. 23, 1902

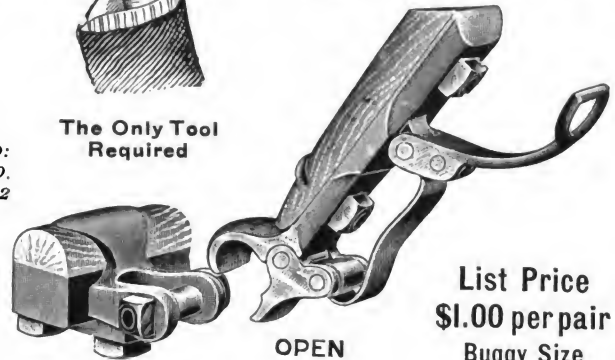
ALL STEEL
RIGHT
THE TIME



The Only Tool
Required



CLOSED

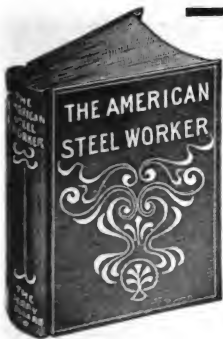


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List Price
\$1.00 per pair
Buggy Size

Liberal Discount to the Trade.

Manufactured by **C. C. BRADLEY & SON, Syracuse, N. Y.**



"BEST BOOK I EVER SAW"

Writes a blacksmith. Lots of others say so, too. Markham has been hardening steel for 27 years and studying it all the time. He tells in plain English just how to handle each case. Shows the best methods; but if you can't get them, it tells you how to do good work with what you have.

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Don't think you've got this information in other books—you haven't. It isn't there. Other books may read nicely and sound well, but none of the authors has had Markham's experience, and that's what counts.

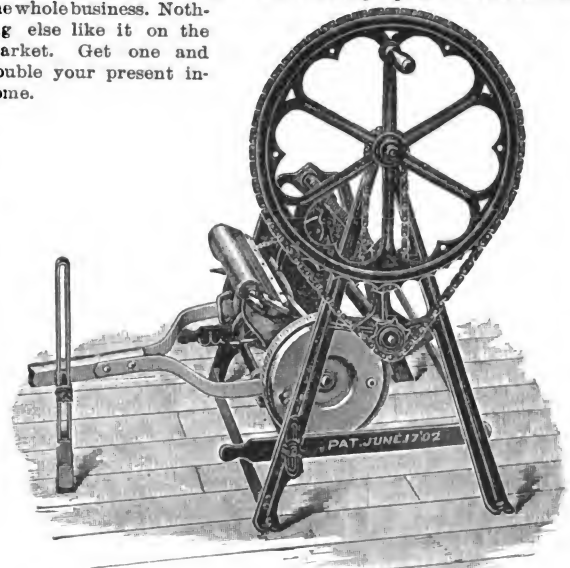
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Money back if not satisfied, or sent on approval.

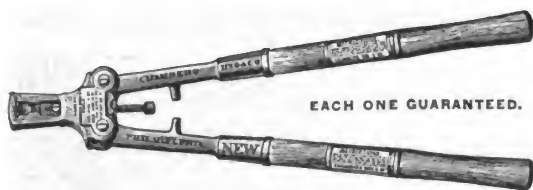
AMERICAN BLACKSMITH COMPANY,
P. O. Drawer 974. BUFFALO, N. Y.

The "Ideal" Lawn Mower Grinder

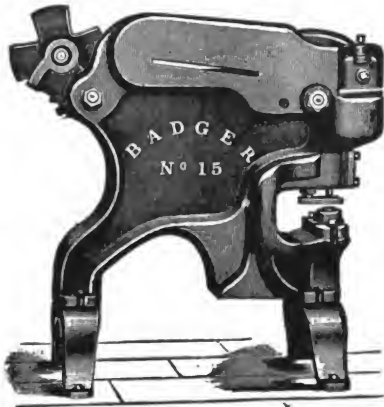
Will enable you to grind any lawn mower with absolute accuracy in less than fifteen minutes, without taking apart. Revolutionizes the whole business. Nothing else like it on the market. Get one and double your present income.



For full particulars, prices, etc., address the manufacturers,
THE ROOT BROS. CO. PLYMOUTH, OHIO

**BOLT CLIPPERS****CHAMBERS BROS. CO.,**N. Fifty-Second Street,
Philadelphia, Pa.**WHAT? YES!**No. 15 **THE BADGER** No. 15

Will punch $\frac{3}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{3}{8}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.



Weight 800 Lbs.

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JANESVILLE, WIS., U. S. A.

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CUTS for any purpose, and all of the highest quality.

Three-Color Half-Tones a specialty.

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Cor. S. Division and Ellcott Sts.
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A veterinary specific for wind, throat and stomach troubles. Strong recommends. \$1 per can. Dealers, mail or Ex. paid. Newton Horse Remedy Co. Toledo, Ohio.

(A Lady can hold him.)

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FOUR BITS IN ONE



Cures Kickers, Shyers, Bolters, Pullers and Runaways.

There are four distinct ways of using it. They sell at sight. Agents make big money selling them. One agent writes: "I am leaving the farm to devote my entire time to the sale of the bit." Send postal for terms to agents.

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A great many Blacksmiths are selling the bits just by showing them to their regular customers at their shops.

STARRETT TOOLS

THE STANDARD FOR

ACCURACY, DESIGN, WORKMANSHIP, FINISH,

L. S. Starrett says:

"If you find any better tools than Starrett Tools—buy them."

HACK SAWS

STARRETT QUALITY.

Complete Catalogue No. 17 AH. sent on request. You ought to have it.

THE L. S. STARRETT CO.,
ATHOL, MASS., U. S. A.**Cortland Welding Compound Co.**

Manufacturers of

Climax Welding Compound,
Cherry Heat Welding Compound,
and **BORAX--ETTE.**

PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX.

BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

SAMPLES FREE.**MAIN OFFICE AND FACTORY, CORTLAND, N. Y.**

CANADIAN FACTORY, HAMILTON, ONT.

Address All Correspondence to CORTLAND, N. Y.

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Practical Carriage and Wagon PaintingA new enlarged edition of a standard book by M. C. Hallick, price, postpaid..... **\$1.00****AMERICAN BLACKSMITH CO., Box 974, Buffalo, N. Y.**

THE

Little Giant**Combined Punch and Shear.****The Most Powerful Lever Punch and Shear Made.**

This is not a new machine—only a new cut showing the improvements we have lately added—making it more valuable for the blacksmith. It is made in three sizes. No. 1 will punch $\frac{3}{4}$ in. hole in $\frac{1}{2}$ in. iron; cuts iron $\frac{3}{4}$ in. thick, and 1 inch round. Weight, 500 lbs. No. 2 will punch $\frac{1}{2}$ in. hole in $\frac{1}{2}$ in. iron, cuts iron $\frac{1}{2}$ in. thick and $\frac{3}{4}$ in. round. Weight, 350 lbs. No. 3 will punch $\frac{1}{2}$ in. hole in $\frac{3}{4}$ in. iron, cuts iron $\frac{3}{4}$ in. thick and $\frac{3}{4}$ in. round. Weight, 275 lbs. Each machine is equipped with five sets of punches and dies. This machine is made for the blacksmith shop and we DO claim that it is decidedly the best on the market for that place, and can furnish any amount of testimonials to that effect.

For Sale by your Jobber. If Not Write Us. Send for Circular.

LITTLE GIANT PUNCH & SHEAR CO., Sparta, Ill.

MORGAN & WRIGHT PADS ARE GOOD PADS



Money-makers for the Horseshoer



Easy to fit. Run larger than other brands



Made of extremely tough stock



"The kind of pads that help to build the pad business"



Send for free copy of
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NEW YORK, DAYTON, ST. LOUIS, ATLANTA, SAN FRANCISCO

1905 BUFFALO DRILL

*With ball bearings
where they count.*

What use are ball bearings if they are not in the RIGHT PLACE?

We put them where the friction and wear come—between the drill spindle and the feed screw. No brass nuts to wear loose. They're under the fly-wheel, too. Made from tool steel, glass hardened, ground and polished. Back gears thrown in without the use of tools. Automatic hand and lever feed. For hand or power use.

Write for full description and prices to the
BUFFALO FORGE CO.
BUFFALO, N. Y.

BALL BEARINGS

NOT HERE

BUT HERE BALL BEARINGS

No. 90 DRILL
Patent applied for



STAR

CULTIVATOR SHOVELS AND SHOVEL POINTS

All Qualities and Sizes.
For Sale by Jobbers Everywhere.
Ask for them.

STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.



BIG PROFITS

BRAZING CAST IRON



Any blacksmith can successfully braze all broken castings in a few minutes, saving the expense of a new casting and the expensive delay of waiting for it.

THOUSANDS OF DOLLARS

are lost daily because of broken castings. The expense of replacing these castings is immense. Much money is lost because of machines lying idle waiting for broken parts to be replaced. You can prevent these large losses by

Mending Castings and make a big profit for yourself. For instance, suppose a gear wheel breaks. It may cost fifteen or twenty dollars for a new one, and the mill would have to lie idle for perhaps a week before the new one arrived. By means of a few cents' worth of **Brazit**, however, you can repair the wheel stronger than new and make as much **Brazit Will Do It.** It will successfully braze cast iron, braze cast iron to wrought iron, or weld steel to cast iron.

With Brazit you can successfully mend broken parts of machinery, agricultural implements, tools of all description, gears, windmills, pumps, engines, automobile parts, sewing machines, lawn mowers, pulleys, stoves, printing presses, and anything made of cast iron.

Our compound opens up a profitable line of work for every blacksmith. You invest practically nothing and the profits are big. You do not require special equipment, as the work is done in your forge. Wide-awake blacksmiths all over the country are taking up this work.

We want every blacksmith and repairman to try **Brazit**, because once they find out how easy it is to work, and what snug profits it makes, they will always keep a supply on hand.

In order to get you started with this profitable line of work we make the following liberal offer:—

We will send pre-paid a complete sample working set for

\$1.00

This set is sufficient to braze a large number of pieces. The directions are simple and complete.

REGULAR WORKING SETS--A complete outfit with plain directions, \$5.00

A trial of **Brazit** is the best way we know of for proving to you it will do as claimed. We want you to try it. You can do a big and profitable business mending all the broken castings in your neighborhood.

Read These Testimonials

WESTFIELD, Mass.
We acknowledge the receipt of your favor of March 4th, together with sample of "Brazit" which we have tried and found satisfactory.
POPE MANUFACTURING Co.

This is to certify that I have had a number of pieces of cast iron machinery mended with "Brazit" which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.

WILLARD N. LANE.

GREENSBORO, N. C.
Your compound just received O. K. Have tested it today on three pieces of cast iron with much success. I have used — made by the — Your **Brazit** is easier to work and does better brazing.

J. C. ALFORD.

SOUTH DARTMOUTH, Mass.
I have used your compound and it worked O. K. Wish I had had some of it before.

MR. THEODORE BRIGHTMAN.

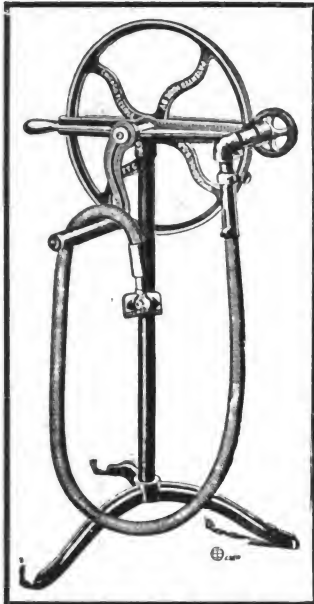
U. S. BRAZING COMPOUND COMPANY

113-115 SO. SECOND ST.

INCORPORATED.

NEW BEDFORD, MASS.

ALL OVER THE WORLD The 1902 Chicago Clipper



Price, \$10.75.

"Stewart's Patent" is recognized as the greatest clipping machine ever invented. More of them are sold every day ten times over than all other makes combined. Each one is sold under a positive guarantee to clip faster and turn easier than any other machine made, regardless of price, or money refunded. All gearing is cut from solid metal, and unlike any other machine made, it can be turned with either the right or left hand.

It's Easy Money

blacksmiths make using this clipper. Horseclipping is now a part of every up-to-date horse shoeing establishment. Why, look at the profit. You can clip a horse in 80 minutes with this machine, and every horse owner recognizes the advantages of clipping. Send \$3.00 and machine will be sent C. O. D. for the balance. Catalog on request. Yours very truly

Chicago Flexible Shaft Co.

186 Ontario Street, - CHICAGO.

MODERN POWER HAMMER

FOR

**BLACKSMITHS AND
IRON WORKERS**

**Used Daily Cures That
"TIRED FEELING."**

Height, 5 Feet.

**Floor Space, 30x40
Inches.**

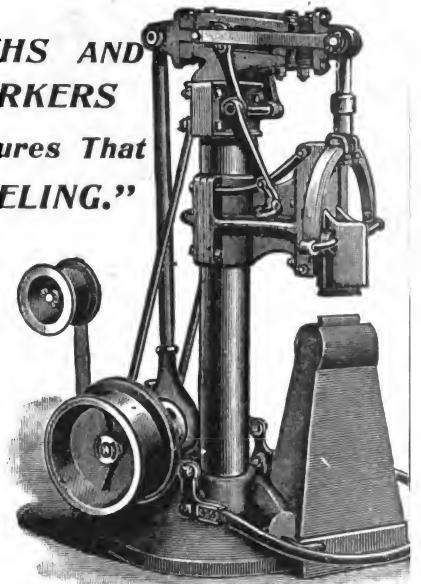
Weight, 1200 Lbs.

Length of stroke changed instantly while running. The only hammer made that will strike a very light blow at full speed. All others slow down to get a light blow.

The "Modern" gives you any blow you want at any speed; hand lever controls the force of blow, foot treadle controls the speed.

Long planed guides adjustable for wear. Cast steel hammer adjustable up and down to suit thickness of stock. Tool steel dies.

Greater range of work than any other hammer.



MANUFACTURED AND FULLY GUARANTEED.

GRINNELL MFG. CO.,

GRINNELL, IOWA.

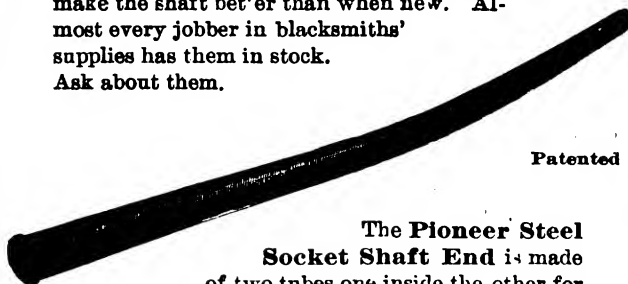
SUCCESSORS TO THE KOCH MFG. CO.

That Broken Shaft!

REPAIR IT by using a

Pioneer Steel Socket Shaft End

It will please your customer; save him money and make the shaft better than when new. Almost every jobber in blacksmiths' supplies has them in stock. Ask about them.



The Pioneer Steel Socket Shaft End is made of two tubes one inside the other for reinforcement. These tubes are filled with a hard-wood stock shaped to fit. The outside tube is finished with a high-lustre black enamel, giving a patent leather appearance that stays on. It has a nickel-plated tip on the end, and a rivet is furnished for attaching to the shaft.

If you can't get them at your supply house, write us. We'll tell you where.

Crandal, Stone & Co.

Manufacturers, BINGHAMTON, N. Y.

THIS BOOK

SHOULD BE IN THE LIBRARY OF EVERY
BLACKSMITH AND REPAIRMAN.....

FORGE PRACTICE

(ELEMENTARY.)

By JOHN LORD BACON,

Instructor in Forge-work,
Lewis Institute, Chicago;
Junior Member American
Society of Mechanical Engineers. 12mo, viii+257
pages, 272 illustrations.

PRICE CLOTH BOUND, \$1.50

Descriptive Circular sent
free upon application

JOHN WILEY & SONS

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43 and 45 East Nineteenth Street,
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CONTENTS

General Description
of
Forge and Tools.
Welding.
Calculation of
Stock
for Bent Shapes.
Upsetting, Drawing
Out, and Bending.
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Making of
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Steam-hammer
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Duplicate Work.
Metallurgy of
Iron and Steel.
Tool-steel Work.
Tool Forging
and Tempering.
Miscellaneous
Work.
Tables. Index.



BUFFALO STEEL PLATE FORGE No. 604
Patent Applied For

Buffalo Steel Plate Forge No. 604.

PATENT APPLIED FOR.

Thoroughly reinforced and braced; practically indestructible. Light, compact, rigid, self-contained. The most powerful blower ever fitted to a forge, combined with an improved tuyere and roomy hearth, give it a capacity far in excess of any portable forge built. Blower is enclosed in dust-proof case, and the gears run in oil. The smoothness of operation astonishes every blacksmith. We stake our reputation on the wearing qualities of this forge. Any repairs due to wear occurring in five years furnished free. See page XXVII. Placed on free trial in your own shop before paying a cent.

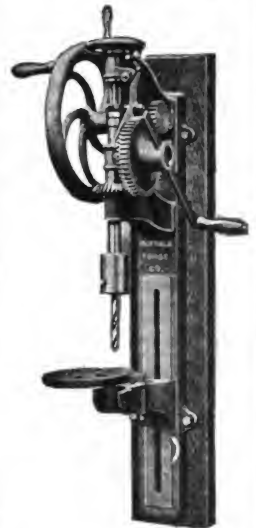
Special Offer to First Purchasers in each County

With the first purchase of a Buffalo Steel Plate Forge No. 604 in each County will be given free a No. 66 or 68 Buffalo Drill. Drill is a standard machine 37 inches

long and weighing 100 lbs. No. 68 is same as No. 66, but has wood back instead of iron. Drills 1 inch hole to centre 15 inch circle. Run of feed $3\frac{1}{4}$ inches. This offer applies to first in the county purchasers only. Be prompt. Don't let some one else get ahead of you. It will pay you. Other styles and sizes as well as the famous lever type hand geared Portable Forges in the new catalogue. Send for it.

The first all steel forge was a Buffalo, and No. 604 is the pacemaker

Built entirely of steel—the fire pan pressed from a **single plate**. The hottest fire cannot crack it.



BUFFALO HAND DRILL No. 68

Given free to first purchaser in each County of a No. 604 Forge

BUFFALO FORGE COMPANY, BUFFALO, NEW YORK.

RELIANCE ENGINES

READ READ

THE PERFECT POWER

Racine, Wis., Aug. 29, 1904.

BEAVER MFG. CO., Milwaukee, Wis.
GENTLEMEN—We have one of your 6 H. P. Reliance Gasoline Engines in operation in our factory, and it is proving very satisfactory, both in giving the rated power and the economy of fuel. Previous to this we had been using a 4 H. P. gasoline engine of another standard make, and this 4 H. P. engine consumed 40% more fuel than the 6 H. P. Reliance. Your engine is all that you claim for it, and we are perfectly satisfied. Very truly yours,

RACINE PAPER BOX MFG. CO.,
(Signed) Per C. A. Broecker.

ALWAYS READY

Springfield, Ill., Oct. 31, 1904.

BEAVER MFG. CO., Milwaukee, Wis.
GENTLEMEN—The engine that I bought of your agent at the fair is all right. Even before my last letter reached you I had discovered the trouble and set it right. It now runs nicely in all sorts of weather, and is the admiration of the community. Thanking you for your kindly information. I remain,

Yours truly,
(Signed) EDWARD JERRY,
Prim Manual Training Dept.

Waukesha, Wis., Sept. 14, '04.

BEAVER MFG. CO., Milwaukee, Wis.
GENTLEMEN—The 3 H. P. gasoline engine that I purchased of you over a year ago gives perfect satisfaction. I use it for separating, milk churning and sawing cordwood. I would not be without it for twice what it cost. I am also going to have it connected to my pump for pumping water.

Yours respectfully, (Signed) GEO. LUBER.

Write for Catalogue No. 15

READ READ

READ READ READ

READ WHAT THE USERS OF THE RELIANCE ENGINES HAVE TO SAY:

Hartland, Wis., Aug. 20th, 1904.

BEAVER MFG. CO., Milwaukee, Wis.
GENTLEMEN—I have one of your 8 H. P. Reliance Engines and am well pleased with it. I run a twenty-four inch Bell City Thresher fourteen hundred revolutions per minute, and can thresh one hundred bushels of oats per hour, at a cost of one-fifth of a cent per bushel. I also run an eighteen inch fodder cutter with a thirty foot carrier and can cut fodder as fast as we can feed it into the cutter, and can grind twenty-eight bushels of corn and oats an hour. Anyone wanting a good engine should buy a Reliance. Yours truly, (Signed) H. J. HANSEN.

No Adjusting, and Use Less Fuel than any Other.

East Fairfield, Vt., Jan. 26th, 1905.

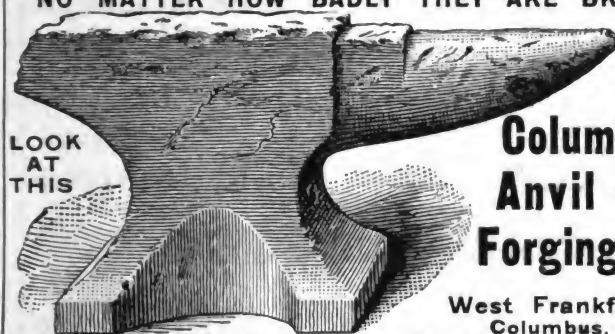
BEAVER MFG. CO., Milwaukee, Wis.
GENTLEMEN—I bought a 3 H. P. engine of you last fall and am very well pleased with it. I can start all my machinery at once, a 12 inch circular saw, lathe, boring machine, emery wheel and grind-stone, and have no trouble in starting it at any time. There are several here who want to buy engines. Please send me half a dozen engine catalogues for my friends. I am satisfied that the engine has all the power you claim for it, and shall recommend it to anyone in want of an engine. Very truly yours,
(Signed) EUGENE F. MINER.

A Written Guarantee with each Engine.

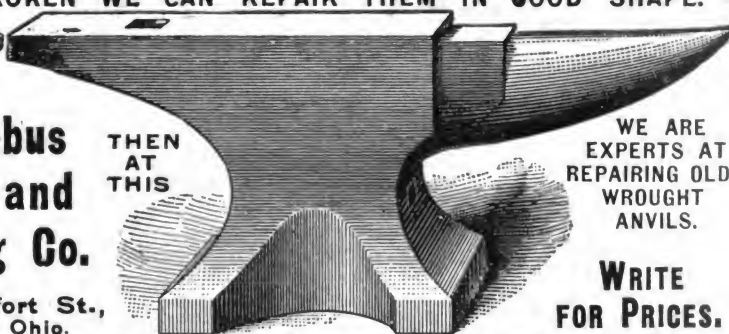
BEAVER MFG. CO.

MILWAUKEE, WIS.

NO MATTER HOW BADLY THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.

LOOK
AT
THIS

Columbus Anvil and Forging Co.

THEN
AT
THISWE ARE
EXPERTS AT
REPAIRING OLD
WROUGHT
ANVILS.WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

ASK YOUR DEALER FOR THEM.

Do You Have Power In Your Shop ?

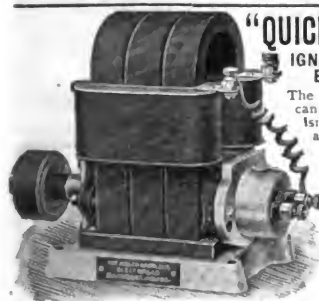
If so, it will pay you to take up the grinding of Lawn Mowers. But do not experiment. It's expensive. I've done it for you. Prices of my Grinders \$75.00, \$150.00 and \$225.00. . . .

C. R. ZACHARIAS, ASBURY PARK, N. J.

Bolster Springs

ALSO WAGON SEAT,
TRUCK AND PLATFORM SPRINGS

Sold by leading Jobbers, or write us
HARVEY SPRING CO.
RACINE JUNCTION, WIS.



"QUICK ACTION"

IGNITING DYNAMOS
Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

The
Knoblock-
Heideman
Mfg. Co.,
SOUTH BEND,
IND.



Lathes and Drill Presses

Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

Catalogue M.

SHEPARD LATHE CO., 132 W. 2d St., Cincinnati, O.

A COMPLETE LINE OF Carriage Tops and Trimmings

Seventeen different grades of tops. All good ones. Prices right.

Ask for No. 5 Catalogue

C. A. HALLIDAY, 24 Cedar St., Oneida, N. Y.



EUREKA SEPARATOR

Placed in Feed Pipe of Your Engine

TAKES the WATER out of GASOLINE.

SAVES HALF YOUR TROUBLES.
SIMPLE, CHEAP, EFFECTIVE.

EUREKA SEPARATOR CO.,
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EATON Letter Company

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Ever Send Out circular letters to the TRADE? Our imitation typewritten letters absolutely cannot be distinguished from the real. They are the kind that get attention, that bring results. Send for free samples.

ONLY HIGH-GRADE WORK DONE.



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Manufactures all kinds of Rubber Pads and Taped Shoes and Screw Calks at prices to defy competition. Get our big Circular and know the rest.

A Good Gear!



DESIGN GOOD.
MATERIAL GOOD.
WORKMANSHIP GOOD.
WE ONLY MAKE THE BEST.

O. M. Milk Wagon
Gear No. 251.

Our exhibits at Milwaukee and New York are right up to the minute. We lead always. Our new catalogue shows sixty different styles of gears as well as our line of Surreys, Buggies, Road and Pleasure Wagons in the white; also all kinds of Bodies, Stick Seats, Tops, Trimmings. **IT'S FREE. Send for it.** With our new buildings and increased capacity we will fill all orders promptly.

SCHUBERT BROS. GEAR CO., ONEIDA, N. Y.



Hinged Butt-Ring
The only loose piece.

The only satisfactory BALL-BEARING AXLE

Sold strictly on its merits, fully guaranteed, and at the cost of a common axle.

Write us at once and you will be surprised.

See that Extension Screw.

The only axle to use on
R. F. D. Mail
Wagons.

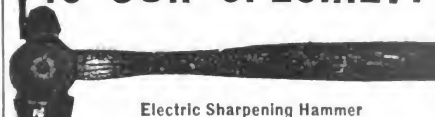


Standard Ball Axle Works Lancaster, Pa.

TOOLS

FOR THE
HORSESHOER
AND

**BLACKSMITH
IS OUR SPECIALTY**



Electric Sharpening Hammer

FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

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Meadville, Pa.

THE EVERLASTING

TUBULAR STEEL DOUBLETREES SINGLETREES and NECK-YOKES

NO WAGON

OR TRUCK

COMPLETE

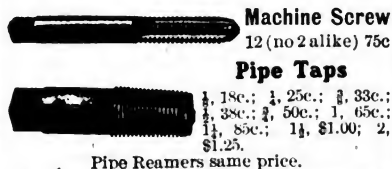
WITHOUT THEM

Pattern No. 56 A.

Equipped with
Forged Fittings

PITTSBURGH TUBULAR STEEL WHIFFLETREE COMPANY, - Pittsburgh, Pa.

Short Price TAPS



Machine Screw

12 (no 2 alike) 75c

Pipe Taps

1, 18c.; 1, 25c.; 1, 33c.;
1, 38c.; 1, 50c.; 1, 65c.;
1, 85c.; 1, \$1.00; 2,
\$1.25.

Pipe Reamers same price.

Standard Machinists' Plug Taps

$\frac{1}{8}$ x 32, 36 or 40; $\frac{1}{4}$ x 24 or 32.....	\$0.11
$\frac{1}{2}$ x 20 or 24; $\frac{1}{2}$ x 20.....	.15
$\frac{3}{4}$ x 18 or 20; $\frac{3}{4}$ x 18 or 20.....	.17
$\frac{1}{2}$ x 16; $\frac{3}{4}$ x 18; $\frac{1}{2}$ x 16.....	.18
$\frac{1}{2}$ x 14; $\frac{3}{4}$ x 14.....	.20
$\frac{1}{2}$ x 12, 13 or 20; $\frac{1}{2}$ x 12 or 13; $\frac{3}{4}$ x 12; $\frac{1}{2}$ x 11.....	.25
$\frac{1}{2}$ x 11; $\frac{3}{4}$ x 11; $\frac{1}{2}$ x 10.....	.30
$\frac{1}{2}$ x 10; $\frac{3}{4}$ x 10; $\frac{1}{2}$ x 9.....	.40
$\frac{1}{2}$ x 8; $\frac{3}{4}$ x 8.....	.60
$\frac{1}{2}$ x 7; $\frac{3}{4}$ x 7.....	.75
$\frac{1}{2}$ x 6.....	.90
$\frac{1}{2}$ x 6.....	1.00
$\frac{1}{2}$ x 5.....	1.25
$\frac{1}{2}$ x 5.....	1.40
2 x $\frac{1}{2}$	1.50

We have the following sizes in sets of 3—Taper, Plug and Bottom, at three times price of plug taps alone.

$\frac{1}{8}$ x 20	$\frac{1}{4}$ x 18	$\frac{1}{2}$ x 16	$\frac{3}{4}$ x 14
$\frac{1}{2}$ x 12	$\frac{3}{4}$ x 12	$\frac{1}{2}$ x 11	$\frac{3}{4}$ x 11
$\frac{1}{2}$ x 10	$\frac{3}{4}$ x 10	$\frac{1}{2}$ x 9	$\frac{3}{4}$ x 9
$\frac{1}{2}$ x 8	$\frac{3}{4}$ x 7	$\frac{1}{2}$ x 6	$\frac{3}{4}$ x 6
$\frac{1}{2}$ x 5	$\frac{3}{4}$ x 5	$\frac{1}{2}$ x 5	2 x $\frac{1}{2}$

1 set each $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{4}$ and $\frac{1}{2}$, 15 Taps in Hardwood Case.....

\$2.75



Full line of $\frac{1}{2}$ oversize Taper Taps to fit all Standard Screw Plates.

$\frac{1}{2}$, 16c.; $\frac{3}{4}$, 20c.; $\frac{1}{2}$, 22c.; $\frac{3}{4}$, 24c.; $\frac{1}{2}$, 28c.; $\frac{3}{4}$, 32c.;
 $\frac{1}{2}$, 36c.; $\frac{3}{4}$, 48c.; $\frac{1}{2}$, 64c.; 1, 75c.

In ordering state thread wanted and make of plate



Odd Job Taper Taps

$\frac{1}{8}$ x 18, 20, 22, 24, 26, 28, 30, 32.....	\$0.18
$\frac{1}{4}$ x 16 all above threads.....	.20
$\frac{3}{8}$ x 16 and all above threads.....	.25
$\frac{1}{2}$ x 16x14 and all above threads.....	.28
$\frac{3}{4}$ x 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32.....	.30
$\frac{1}{2}$ x 12, 13, 14, 16, 18, 20, 22, 24.....	.35
$\frac{3}{4}$ x 10, 12, 20, 24.....	.40
Left hand, $\frac{1}{2}$ x 20, 24.....	.35
Hardwood case with 15 above Taps as sorted for bicycle work.....	\$2.75



Best Twist Drills

$\frac{1}{8}$ 3	$\frac{1}{4}$ 3	$\frac{3}{8}$ 3	$\frac{1}{2}$ 3	$\frac{3}{4}$ 3	$\frac{1}{2}$ 4	$\frac{3}{4}$ 4	$\frac{1}{2}$ 5	$\frac{3}{4}$ 5	$\frac{1}{2}$ 6	$\frac{3}{4}$ 6	$\frac{1}{2}$ 7	$\frac{3}{4}$ 7	$\frac{1}{2}$ 8	$\frac{3}{4}$ 8	$\frac{1}{2}$ 9	$\frac{3}{4}$ 9	$\frac{1}{2}$ 10	$\frac{3}{4}$ 10
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Above set of 12 Drills for 64c.

Set of 60, number sizes 1 to 60, \$2.75. Maple Block, 20c. Iron block, 65c. extra. Complete drill list on request. Drills mailed for 10 per cent. extra.

All Taps smaller than 7-16 in. mailed prepaid. Will properly postage or express on all sizes, 7-16 to 3-4 in., for 10 per cent. extra. Larger than 3-4 in. for 20 per cent. extra, or for all orders over \$10, will deliver anywhere in U.S. within 500 miles for 50 cts. within 1000 miles for 75 cts. and over 1000 for \$1.

You can, if you prefer, deposit price with bank, express agent or postmaster, to be sent us on receipt of goods.

WESTERN TOOL CO., Lansing, Mich

RUBBER RUNABOUT, \$35.00
TIRED
TOP
BUGGY.
\$27.50



BUGGY
TOPS,
\$4.50

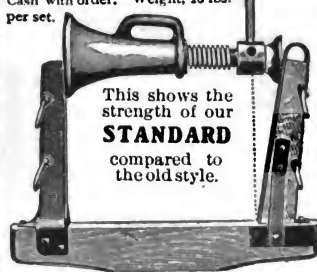
Write for 100-page Catalogue. It's free. Compare Our Prices.
BUOB & SCHEU, Estab. 500-500 EAST COURT ST.
1883 CINCINNATI, OHIO.

IMPORTANT NOTICE.

If the Blacksmiths who are intending to purchase a *Trip Hammer* will communicate with us, we will gladly mail them an Illustrated Circular giving a description of our "*Little Sampson*" Hammer, and we will quote them a price that will insure us their order.

Coleman Iron Works Co., Elmira, N.Y., U.S.A.

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3 1/2 " 14 "
" 3, 3 3/4 " 10 "
Price, \$1.50 per set of 4 stks
Cash with order. Weight, 16 lbs.
per set.



This shows the
strength of our
STANDARD
compared to
the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time straightening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 x 2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wool stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.

Blacksmiths' Tong's

Are drop-forged, without weld, from one solid piece of superior steel. They are smooth and uniform, with handles tapering to the right proportions.

Will hold round, flat, square or oval stock. Far superior to any hand-made tongs, and can be furnished for half the cost.



V Tongs for Holding Round and Square Iron.

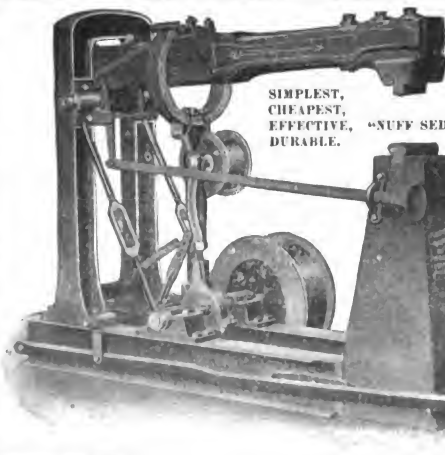
Machine Tool Tongs, Big Tongs, Little Tongs, All Kinds of Tongs. Superior quality; 100,000 pairs in use.

Write for Catalogue and Price List to

Allen-Randall Co.

310 MAIN STREET,

SPRINGFIELD, MASS.



SIMPLEST,
CHEAPEST,
EFFECTIVE, "SUFF SED."
DURABLE.

Hathorn's Hard-hitting Helve Hammer.

Ask your dealer or write to

HATHORN
FOUNDRY &
MACHINE
CO.
GRINNELL
IOWA.

THIS IS A "WEST HYDRAULIC" POWER TIRE SETTER

Look at it.
Look Carefully

Note the heavy, durable, compact construction; the turned surfaces of the pressure rams, which, together with machine-finished blocks or "dies" for reaching wheels of various diameters, make it the most accurate machine ever designed for setting tires cold.

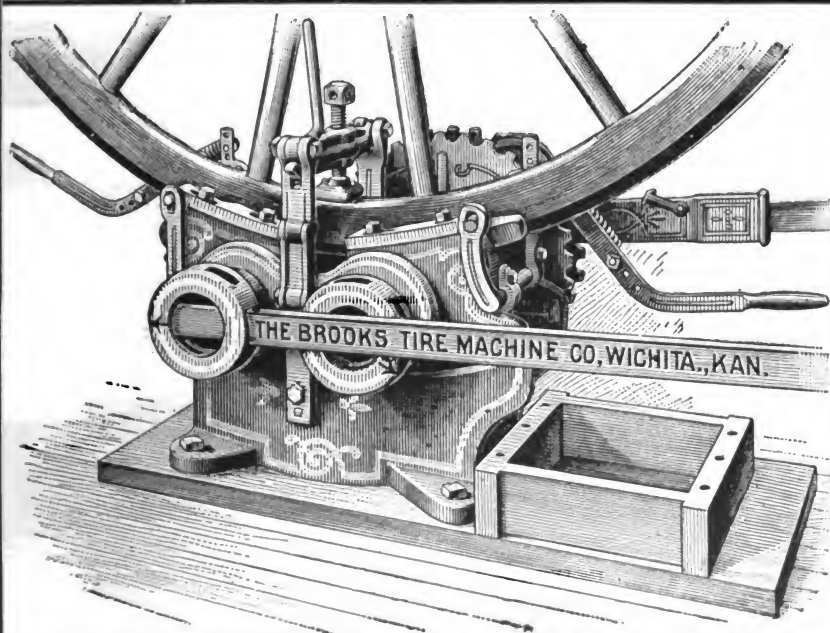


WE ALSO MAKE HAND TIRE SETTERS FOR THOSE WHO DO NOT HAVE POWER.

Write us YOUR requirements.

THE WEST TIRE SETTER COMPANY,
ROCHESTER, N. Y.

The Highest Medal or Award of Merit



Awarded to any Cold Tire Setter exhibited at the Louisiana Purchase Exposition was awarded to the

Brooks Cold Tire Setter

The Experts of the Jury of Awards were convinced by the actual operation of the machine that **there is none better** and that is what our customers say.

They do the work more rapidly, with more satisfactory results and are the most durable.

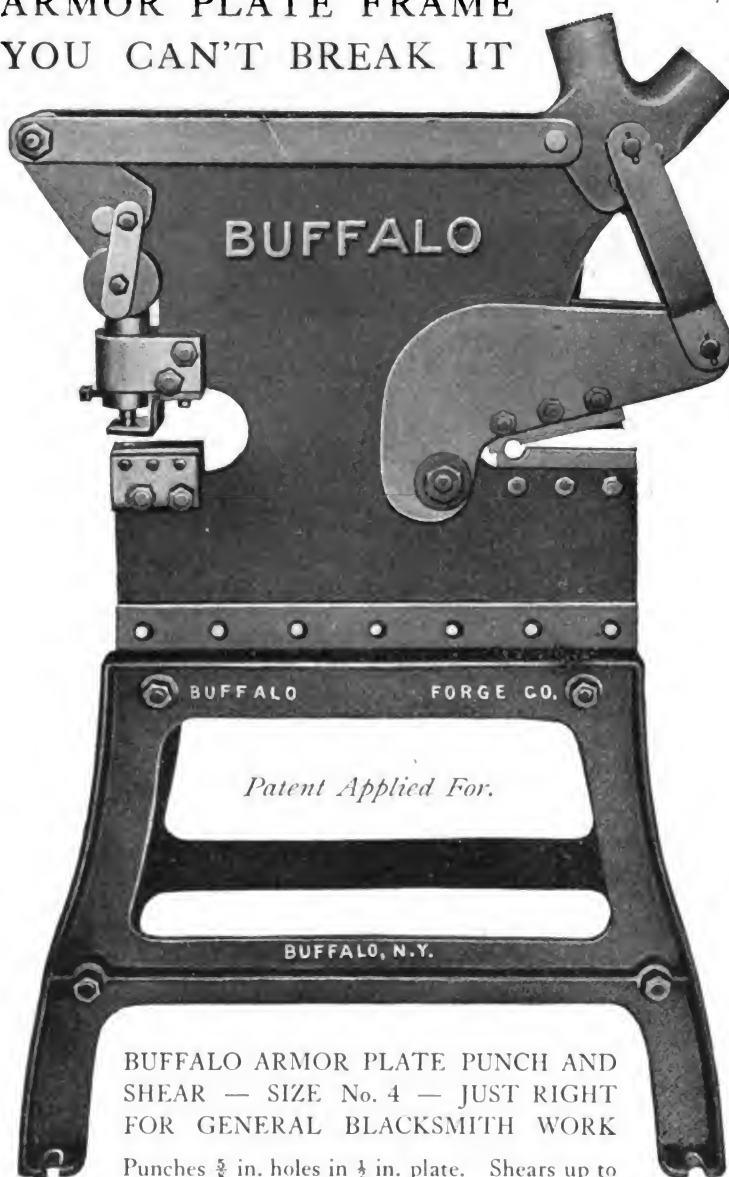
Many are ordering now under our special winter terms.

Write for these terms and complete catalogue and testimonials.

THE BROOKS TIRE MACHINE CO.
121 N. WATER STREET, WICHITA, KANSAS

Buffalo Punch and Shear

ARMOR PLATE FRAME
YOU CAN'T BREAK IT



BUFFALO ARMOR PLATE PUNCH AND
SHEAR — SIZE No. 4 — JUST RIGHT
FOR GENERAL BLACKSMITH WORK

Punches $\frac{5}{8}$ in. holes in $\frac{1}{2}$ in. plate. Shears up to
 $\frac{3}{4}$ x 3 in. bars (cold). Depth of throat, $5\frac{1}{4}$ in.
Height over all, 44 in. Weight, 345 lbs.

SEND FOR CATALOG OF OTHER SIZES
Also full line angle iron cutters and slitting shears—all sizes.

This No. 4 Combined Punch and Shear is a faithful shop servant that don't break, is always ready for odd jobs of all sorts, and earns a revenue each month. You cannot break the frame. It is made of Armor-plate steel with jaws, guard plate, sockets, links, die block, plunger, etc., machined from solid forged stock. The jaws are of large proportions for the work, avoiding all springing or twisting. A Guarantee Certificate protecting you against repairs from breakage of frame for five years is given with each machine sold.

Now, to get one machine in each county, quick, which will bring more orders than all the printers' ink in America, we offer free a No. 66 or 68 Buffalo Drill with the first one sold in every county. Write for full details.

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BUFFALO, N. Y., U. S. A.

PUT A Roller-Reach-Iron

On the next farm-wagon you build or repair, and see the satisfied smile on your customer's face.

No sway-bar or hound to grease, little or no wear on irons, put on same as old Rub-iron

20 cents each. 10 or 25 in box.

W. T. Daum & Bro.
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**Power Punches,
Lever Punches,
Lever Shears and
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We equip shops and factories with Power, Gasoline or Steam Engines. We make all kinds of dies and special tools for the trade. Write for free booklet. Address,

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A WONDER WORKER

**NORTH STAR
HARDENING COMPOUND
WORKS LIKE A CHARM**

For steel, especially plow lays, it can't be beaten. Makes them hard and tough, but will neither warp nor crack them.

GUARANTEED TO ACT AS REPRESENTED.

\$3.50 Per Box. Enough for 48 gallons of water. Orders up to March 15th will be filled at \$3.00, express paid.

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Direct-connected to General Electric Co. Motor

IS THE BEST

LOW
PRICE

PROMPT
DELIVERY



Write for descriptive circular and price list.

The Electric Blower Co.
141 South Clinton Street
Chicago, Ill.

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which accurately records the distance travelled by any wheeled vehicle, and announces the passing of each mile by a sharp stroke of a BELL.

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will come to an end if you get the old reliable Universal brand.



Send for our free booklet with hints on the use of the hack saw.

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For Carpenters, Wagon Builders, Cabinet Makers and Wood Workers Generally.

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Machines Sent on Trial. Send for Catalog A.

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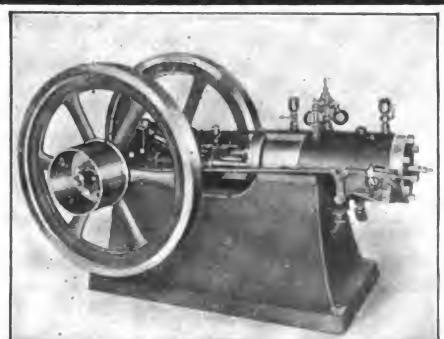
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They have features worth many dollars to you. Use less fuel than others. Always ready to run. Simplest in construction, longest service, and is guaranteed in every respect or money refunded. We have an attractive price to the first purchaser in a place. Write today.

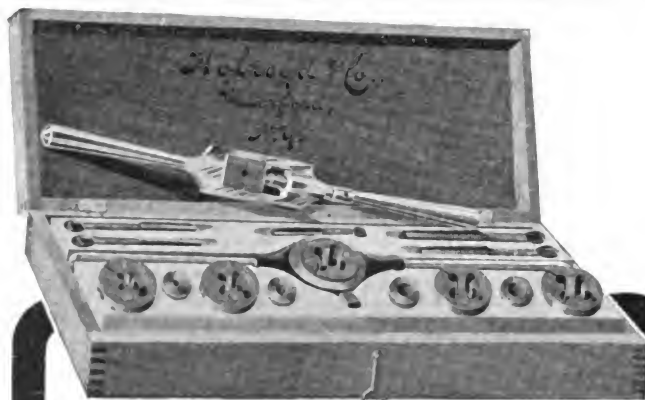
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BUFFALO, N. Y.



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BEAUTIFUL WATCH CHARMS.
We will send you a Hammer, Cleaver or Wrench, Postage paid on receipt of

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ESTABLISHED 1847.

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HOLROYD Screw Plates, Taps and Dies are the best attainable, most perfect of modern appliances, and their work bears the closest inspection as to accuracy, quality and results.



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CUT QUICK.

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.

"CHICAGO" WHEELS save time.

They're made of stuff that cuts.

Emery Wheels.

Glue, Emery,

Polishing Wheels,

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Made by

Chicago Wheel & Mfg. Co.

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CHICAGO, U. S. A.

136 Page Catalogue for the Asking.

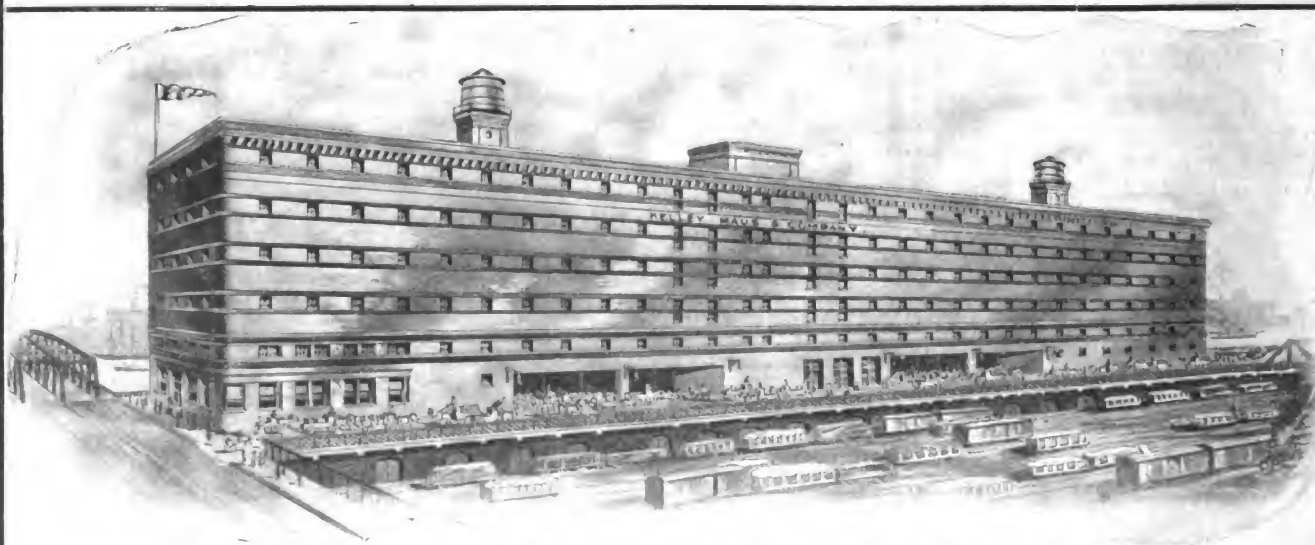
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Heavy Hardware

Carriage Trimmings

Iron and Steel



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Send for New '05 Catalogue.

Lake Street Bridge
Chicago.

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

MARCH, 1905

NUMBER 6

BUFFALO, N. Y., U. S. A.

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Incorporated under New York State Laws.

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Duly entered as second-class mail matter, at Buffalo, N. Y. Act of Congress, March 3, 1879.

Our Prize Contest.

Recently the AMERICAN BLACKSMITH announced to its friends the opening of another prize contest. New subscriptions are what we want, and we will equally divide \$50.00 in gold between the 10 persons sending us the largest number before May 1, 1905. Here is an easy chance to win a bright \$5.00 gold piece. So far it is any man's money. The entries have been large in number, but the lists of new names have been comparatively small. A club of say 10 new subscribers should stand an excellent chance for a good prize.

Protection for the Smith.

The attention of every man, who has the welfare of the craft at heart, is called to the interesting article on page 111. When the lien law movement was started, the public did not think it possible to arouse the smiths to such activity, but recent developments show that they have taken hold of the matter with firm determination and are bound to obtain the protection they deserve. And why should not the smiths enjoy such legislation as well as the members of other crafts? There is but one answer to this question, for surely there can be no direct opposition to a law of this kind.

The defense of the honest workman against the deceitful practices of the "dead beat," is all that is asked.

A Popular Move.

The pink Buffalo stamps, which we recently furnished to our readers, have caused much interesting comment. Subscribers to THE AMERICAN BLACKSMITH were quick to realize the advantages of putting these stamps on their letters and as a result have been using them quite freely. Of course, our readers are supposed to use these stamps at every opportunity, for the protection which they afford has been satisfactorily demonstrated. They imply that the user is backed by the influence of an energetic and powerful publication; that he insists upon his rights and demands square treatment.

The many requests which we have recently received for additional supplies testify to their popularity and it is indeed gratifying to learn that our readers appreciate our efforts in their behalf.

As soon as your supply of pink buffaloes gets low, write to us, and we will immediately dispatch you another herd.

The Early Bird and the Worm.

It is just at this season of the year that the ambitious smith looks forward with anxiety to the possibilities of a brisk spring trade. Are you prepared to handle your share of it? Are you equipped with all the tools and machinery necessary to meet the demands of your several customers? Now is the time to steal a march on your neighbor smiths and show them that you possess some of that characteristic grit and energy always found in the make-up of the progressive craftsman.

Many smiths make use of the dull times between seasons for taking an inventory of their tools and stock and adding such new appliances to their equipment as they see fit. One of our friends in Mulvane, Kansas, wrote, under date of Feb. 9th, that he had recently installed and paid for a 4-H.P. gasoline engine, a trip hammer, an emery stand, and a power drill, costing about \$500.00.

This is indeed most commendable. The idea of constantly adding new tools to your shop is an excellent one, and more smiths should get the habit. One of our Ohio friends tells us that he takes advantage of these odd times by "cleaning up," as he terms it. Every few months, in spite of his efforts to prevent it, there accumulates quite a pile of worthless matter—which at first seemed a pity to waste, but which has proven of no use whatever. And this is the case in almost every busy shop. Odd pieces of stock and other remnants will collect, till the smith finds them in the way and must dispose of them.

A neat, clean shop makes a lasting impression on customers. Take advantage of this hint and have your shop in the best possible shape when the busy season opens.

Advancement in the Craft.

The rapid strides towards advancement which have been made during the past few decades, in the blacksmithing craft, cannot help but attract the attention of the observing man. Indeed, it is true that the smith himself has been constantly alive to the general progress in the industrial world, and circumstances today prove that his conditions have been greatly changed. And this alteration has taken many different forms. Not only has the smith made himself a much more proficient workman, but he has also cultivated a desire for a better and a higher class of work. In addition to this, the blacksmiths of the twentieth century are daily organizing and forming beneficial associations and have even gone so far as to demand certain laws and legislations for their protection. It is this last move, more than anything else, which stamps the smith as wide awake and progressive, and the public respects him all the more because of his demand for such recognition.

A few years since, any man who could do a fairly good shoeing job was known as a good blacksmith. Today the name conveys quite a different meaning

and requires many skilfull accomplishments to back it up. The smith is no longer contented with a dark and dingy shop in some weather-beaten building. Instead we find him, for the most part, located in a substantial structure furnished with up-to-date tools and machinery. On the sign at his door we read such announcements as "Expert Horseshoeing," "Practical Blacksmithing of all kinds," "Hand-made Shoes a Specialty" etc., and in many cases we find the smith very adept in ornamental wrought iron work, a most artistic side line. In this connection it might not be out of place to mention that the popular feeling which exists today and which is growing constantly in favor of this kind of work makes it very profitable and gives the clever smith an opportunity to prove his skill, for it requires an artistic eye and a steady hand.

All these developments tend to bear out the fact that the craft has advanced and is advancing. Let the improvement in the future be even more conspicuous and the craft will be elevated to the position it deserves.

A Valuable Invention Lost.

Many crafts, in their evolution from infancy to maturity, lose some important and oftentimes valuable invention or formula. In the case of the metal working industries, it is a combination of metals used by the Aztecs and Egyptians in making their tools and arms. This combination was used very extensively by these nations, but baffled the scientists of later days and became a lost invention. The great Humbolt, finding a chisel in an ancient silver mine, tried to discover the secret of its combination by analysis, but all he could disclose was that it resembled a mixture of copper and tin, and as the combination was capable of being prepared in a manner so as to equal in hardness the finest steel as produced by the most scientific process of modern times, these certainly could not have been the only ingredients of the compound. The hardest known substances, such as granite and emeralds, were quarried, shaped and cut with instruments made of bronze and copper, but the secret of treating, tempering or working these metals or combination of metals

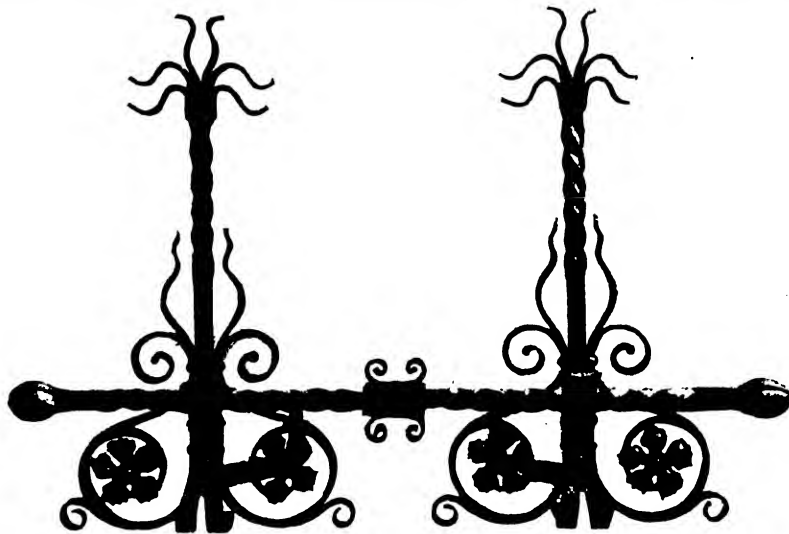
has never reached modern civilization.

Should some lucky individual discover either by chance or by studious practical investigation this combination of metals and the secret of treating and working the same, he will have gained fame and fortune and have given to the industrial world an invention of the greatest value. The rediscovery of this lost art would very likely revolutionize the many trades in which steel now holds so prominent a position, and copper would undoubtedly be preferred in many industries and trades providing it could be tempered as it was in ancient times.

Perfection in the Blacksmithing Craft.

J. M. FIX.

In order to reach the highest plane in the art of blacksmithing, as well as in



A PAIR OF ANDIRONS, SHOWING A HANDSOME TWISTED EFFECT.

other vocations, it is necessary to train the mind first. Someone has said "Education is the understanding of the relations between things." Blacksmithing is an education of the mind to direct, and the hand to execute, along a certain line. In order to reach the highest round of the ladder in this noble art and science, one must possess the determination to excel. In order to do this you must have your plans ahead of your work, that is, you must think ahead. If you intend to unite two pieces of iron by welding, you must see that the pieces are properly scarfed and you must know how to place them on the anvil when you take them from the fire. Especially is this the case if the work is at all complicated. In the nature of some welds, it is impossible to obtain a second heat. In such cases it is especially necessary that great care and judgment should be exercised to complete the weld at one heat. The rule "slow and sure" does not apply

here. In order to make a perfect union of two irons by welding, the operation must be made rapidly. This applies to irons of moderate size down to the smallest, for the atmosphere alone will soon cause the temperature to go below the perfect welding heat, whether it be below or above zero. But besides this natural law, the anvil being the larger of the two bodies, and having no heat in it, soon causes the heat to fall below the welding temperature. So it follows that this kind of work must be rapidly performed in order to accomplish the most and the best results.

The main object of this article is to stimulate, at least to some degree in the younger smiths, greater effort towards a higher degree in the art of smithing. But this does not apply solely to those who have only been a few years in the

business, for the writer himself worked at the forge for many years before he discovered his own ability to make a succession of difficult welds in one piece of work so perfect that no one could find any trace of them by filing.

Handsome Designs in Ornamental Iron.

The two examples of ornamental wrought iron accompanying this article are typical specimens of the clever designs executed under the direction of Mr. Thos. Goog-

erty, who is in charge of the smithing classes at the Illinois State Reformatory. The ornamental iron work done at this institution has won much admiration and many of the models are indeed worthy of considerable study and attention. In the classes in which artistic smithing is taught, the main object is, not to see how much work can be turned out, but rather how well and accurately it can be done. In all cases, originality in design is absolutely necessary and, for the most part, the work is done entirely by hand.

The result of such training is indeed very gratifying. Almost every design is treated in different style—always appealing to the artistic eye and never failing to leave a pleasing impression. The first engraving shows a very neat pair of andirons, decidedly handsome in every detail. Careful study will prove this model to contain many of the simplest elements of design and

shows a very clever combination of both scroll and twist.

The second engraving is of a more elaborate piece of work and subjected the smith to great patience before it was completed. However, both his skill and taste have been very readily demonstrated. The bowl is made of copper, while the beautiful roses adorning it are of wrought iron. The white marble top finishes the stand in good taste, and rose bowl and stand complete make a fitting ornament for any household.

These are but two examples of the kind of work the blacksmith can do at spare times. No difficulty is ever encountered in disposing of work of this kind and generally a good price can be demanded for it, making art smithing a well paying branch of the craft.

The Gas Engine.—6.

E. W. LONGANECKER.

Caring for the Gasoline Engine.

Every gas-engine operator is anxious to have his engine run well, provided he is not prejudiced against it. To run well, a little care every day is necessary, such as oiling and cleaning, which were referred to in our former article on this subject. In addition to oiling and cleaning, daily attention is required by the igniting mechanism. Nearly all stationary engines now in use are fitted with electric igniters, using the hammer break method of making the igniting spark. It is also known as the touch spark and kiss spark to distinguish it from the jump spark which is so commonly used in the automobile engine. We hear quite a good deal about the wipe spark, which is a slight variation from the hammer break spark, in the manner of separating the contact points. The former method employs a contact, wipe and slip-off movement, the latter, a contact pressure and direct, reverse separation movement. Both have for their principle of operation a movable part, and both contact points are within the compression space or igniting chamber. The extreme heat in which these contact points have to work subjects them to a very destructive influence and consequently they require quite a bit of attention. They need to be noticed and cleaned frequently. I would say once each day where the engine has a regular run of from 4 to 10 hours per day. Smoothing these points up with a very fine file at the point of contact and cleaning them from carbon deposit with fine emery cloth will keep them in good condition.

As these contact points wear down, the contact is lighter and of shorter duration. This sometimes prevents a

regular and successful spark. The points must then be moved so that new points of contact are made or they must be replaced entirely with new points. Manufacturers, recognizing the fact that platinum is capable of withstanding a very high degree of heat, use it for contact points in preference to other metals, notwithstanding the high price of it in comparison with other metals. With a good strong electric current steel points can be used very successfully but may require a little closer attention and must be renewed oftener. In addition to clean and smooth igniter points, all the



A HANDSOME EXAMPLE, SHOWING BOTH ELEMENTARY SCROLLS AND ADVANCED HAMMERED WORK.

mechanism that operates them must be carefully guarded, so as to prevent excessive lost motion due to unnecessary wear of the parts. One of the points is always insulated from the iron walls through which its stem passes to connect on the outside with the wire carrying the electric current. This insulation, especially on the inner end or the end that is on the interior of the cylinder, needs occasional attention and must be kept clean; a heavy coating of burnt carbon may bridge it over and cause a short circuit. Short circuits outside of the cylinder between the binding posts on the engine, or between the two wires from the battery to the

engine, in the spark coil, or even between two battery cells, may cause trouble. Care is necessary to keep the spark coil from getting wet or damp, and to keep the wire connections on it good and tight, as well as those on the engine and on the battery cells. And above all, keep a good battery, dynamo or magneto to generate a current. An engine may run on a weak current, but it will give all kinds of trouble.

Regular care of all the igniting mechanism is very necessary. If there is a current switch or cut-out switch in the circuit it must always be open where the engine is stopped, otherwise it will use up the current from the battery on short circuit. The exhaust valve must have attention every week or two to see that it has a good seat and lifts high enough from its seat to have plenty of clearance, and to notice that no undue wear is going on. Sometimes the valve stem or sleeve through which it passes bears heavily on one side and causes it to wear. The cause of this should be located and remedied at once. The cams opening the valves must be kept from wearing, or cutting out, by proper cleaning and oiling. The cam rollers sometimes get gummy and cease to roll on their spindle and simply slide over the cam, which soon wears a flat place on them and destroys their usefulness. One should familiarize himself with the compression pressure in his engine and test it often, by turning the wheels until the piston goes up on the compression stroke. If it rebounds you may be sure that the valve seat is good. But if you can turn it on over the compression point easily it indicates a leak through the valves, piston rings, igniter mechanism or some other point. The gear driving the cam shaft should be well oiled and regularly cleaned. If it is allowed to begin cutting the least bit it will soon be ruined. If gasoline is the fuel used, its regular supply to the engine is quite important.

The pump used to supply the engine from the tank must be kept properly packed and the check valves kept clean and working properly. Candle wicking and soap is a good pump packing. Gasoline will not dissolve soap as it readily does tallow and other greases or oils. Where a tank is used to supply water for cooling purposes it should always be kept well filled when the engine is running, so as to insure free and easy circulation. In cold weather the water should always be shut off from the engine from 3 to 5 minutes before shutting the engine down, and the drain cock opened.

The heat from the few minutes' run will aid in draining the engine quickly as well as drying the water space after it is drained. This will insure against freezing or frost in the water space. A gas engine should always be started first and the water turned on immediately

3-horsepower Diehl motor. At one end of the shop is a suitable storeroom for iron, steel and supplies. The shop is well lighted by an overhead sky-light and electric lights. The course is so graded that the student is taught the successive processes of his work. The

includes the principles of tempering.

The student is advanced as rapidly as his proficiency will permit. At the outset of the course simple work is done, and as the student acquires skill he is advanced to more difficult work.

Several Shop Experiences.

JOHN W.

One brother inquires about an overhead bellows. I once had such a bellows that worked very satisfactorily. The connection was 2½-inch gas pipe. The pipe was well rimmed at the ends and the small part of the bellows nozzle was cut off. If a blower were put up there the connections should be at least one inch larger and by right the elbows should have a larger circle. Air, fluids and gas, all abhor a square corner or turn, and anything approaching this is a detriment to their easy movement.

Another brother states that in putting clay in a forge, he mixes it thin. My experience is entirely different, that it should have no more moisture than just enough to have it adhere and not crumble when pounded in with the forge hammer. The more it is pounded the better, and the less moisture the better. It is the drying out of the



PART OF THE SMITHING CLASS AT THE NEW JERSEY REFORMATORY AND THE GATES MADE BY THEM.

after. If water is turned on first it may cause sweating and dampness in the cylinder, which would interfere with easy starting. No part of a gas engine should be allowed to become rusty. The exhaust pipe must be kept open as well as the passage admitting the air to the cylinder.

Forge Work at the New Jersey Reformatory.

J. T. JACQUES.

The work of the inmates of this institution during their term consists of instruction in various trades, such as shoemaking, plumbing, steamfitting, tinsmithing, engineering, painting, tool-making, blacksmithing and horseshoeing. The system employed in the instruction of these trades not only teaches the student to use the material, but teaches him the value, uses, nature, composition and elements of the material he works. Outside of the assigned lessons, the students are encouraged to make up something of their own design. The course in forging is drawn up so as to teach the fundamental principles of smith work and the heat treatment of iron and steel. It brings into execution the combined training of the mind, hand and eye, which is the secret of the well developed courses of workshop instruction prevailing in this institution. This is accomplished by a carefully graded course of forty or more exercises. The equipment of the forge shop is as follows: Sixteen forges and anvils and the necessary small tools, shears for cutting hot or cold metals, blacksmith drills, vises, swage blocks, work benches, grind stone, buffing wheel, emery wheel, power drill and one

first exercise is to draw out a piece of square iron to a flat edge at one end and a point at the other. The second is similar, but requires swaging over the corners of the anvil. The third introduces the bending and forming of a ring from round iron. The fourth is a compound bend to be worked. Through the entire course the student is carefully taught the processes and application of the principles of forging. These consist of drawing out and pointing, swaging over corners of anvil, bending, twisting, upsetting, splitting, punching, forming round, hexagonal, octagonal and rectangular shapes and the principles of welding used in rings, laps, splits, chains and butt ends. In tool work the student is required to redress an old worn-out tool of each kind and then to make new ones.

The repairing and making of the institution wagons are from the students' own ideas and types. The students are also instructed in drawing, for it enables them to follow their courses scientifically. The manufacture of iron and steel is fully explained, as is also the composition and heat treatment of the same.

In forging, the instruction is in the management of the fires, drawing down, bending, shortening, welding, splitting, punching, chamfering, riveting, railing and housework. In vise work, the instruction is in filing to line, fitting tongues and grooves, clipping, bevelling, scraping, ringwork, drilling, etc. In tool-making, the instruction includes machine, lathe, millers, stonecutters, carpenters, plumbers and steamfitters, tin and coppersmiths' tools. This also



SOME WORK EXECUTED AT THE NEW JERSEY REFORMATORY.

water that makes the clay shrink and crack. The top can be smoothed off by pounding a piece of plank upon it, and a fire can be started in it at once

without danger of cracking, if it is dry and pounded enough. I once set a 24-foot by 48-inch boiler where there was neither brick nor stone in this manner, and although the mill burned down and was abandoned five years later, yet six years after, the boiler walls were whole and without cracks.

While I was at that mill, in some unaccountable way one of the caps to a pillow block on the engine shaft broke across, through the oil cup. Fortunately, the pillow block was set on a timber 18 inches square. A hardwood piece 8 by 8 inches and 6 inches longer than the pillow block was fitted to the cap. Four $\frac{3}{4}$ -inch bolts were screwed down one foot into the foundation timber. These came up through the improvised wooden cap with a nut on top. The

other end against the hub. I screwed these together with wood screws, struck the circle at the rim and worked it into shape. This served so well that he never got a new pulley. As I said before, there is almost always a way out of these difficulties. In an experience of nearly half a century, I do not recall a single thing brought to the shop and worth fixing that was not repaired, but I do recall some that were done more for accommodation than profit.

Grocers' Light Top Delivery Wagon—2.

J. LAWRENCE HILL.

The plans and making of the top to this wagon having been detailed in the February issue of THE AMERICAN BLACKSMITH, we will now continue with the making of the running gear.

a straight plate underneath it, through one end of which the clip goes. Fig. 5 explains this more clearly. The reach butts up against the inside of the axle, (thus doing away with a rear axle bed), and should be a trifle thinner than the axle, so that when the clip and bolts are screwed up, the plates bind firmly on the axle and keep the reach in place. The front end of the reach is mortised into the head-block, level on the bottom.

The fifth-wheel is of the Derby pattern, or it can be easily made by a mechanic. To do this, take a piece of $\frac{5}{16}$ by $\frac{3}{4}$ -inch iron and bend it around a 14-inch circle a little more than half way, for the bottom half. Drill $\frac{5}{16}$ inch countersunk holes each side of the axle and fasten on with bolts and a yoke through the top; a $\frac{1}{4}$ -inch bolt in each

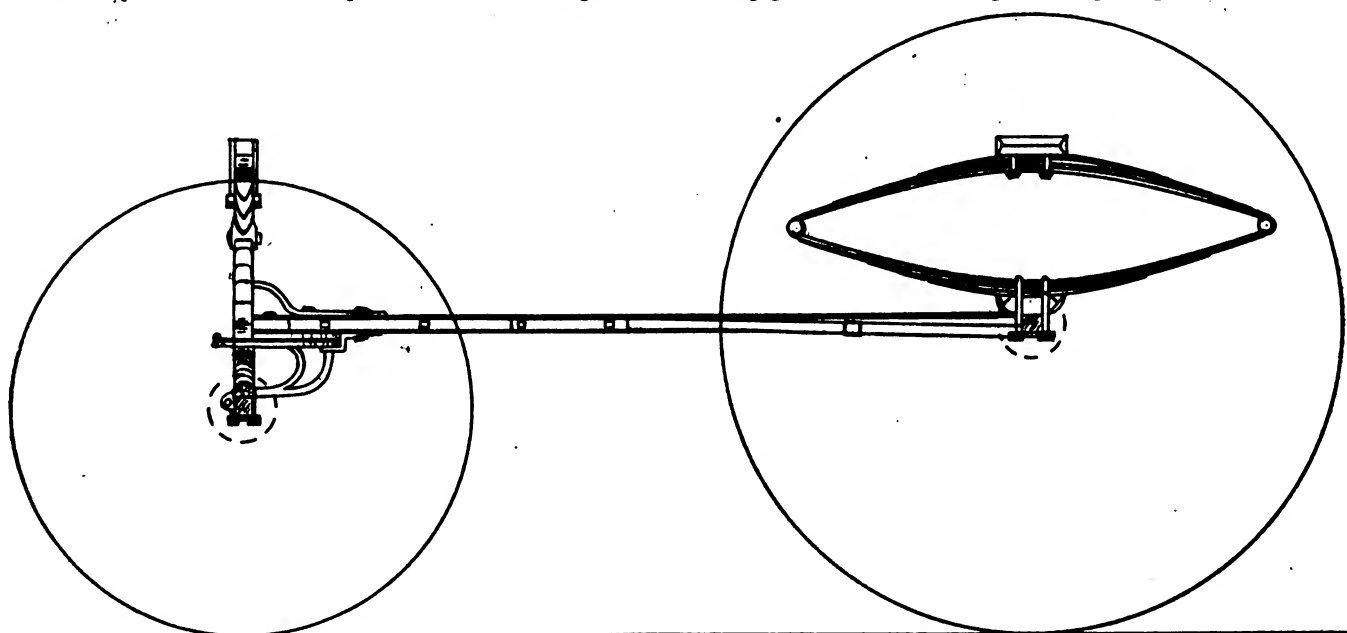


Fig. 2.—SHOWING SIDE ELEVATION OF THE RUNNING GEAR OF THE GROCER'S WAGON.

only delay to the running of the mill was the time it took two men to cut the threads on the bolts and to screw in the last bolt. When asked as to how I knew so well and quickly what to do, I replied that I had once fixed a broken cap on a mowing machine in the same way. The next funny thing to occur was, the pump froze and burst a head, but the break being outside the inner edge, the packing and a piece of wood across each head and two bolts through them allowed business to continue.

A thresher brought a 12-inch pulley with 2-inch face with nearly $\frac{1}{4}$ of the rim gone between the spokes. It was going to rain and two stacks were open; could I fix it? They had forgotten to bring this broken piece, so I fitted two 1-inch pieces against the flare of the spokes and rim, letting the wood extend through the broken place and the

Fig. 1 is the side elevation of the gear. This style is more easily made than a platform gear, and is also less expensive. By the use of a perch the body can be made lighter, as the pull or draft is transmitted from the front wheels through the perch or reach to the hind wheels, while in a platform gear the pull has to go through the body to the hind wheels.

Fig. 2 is the half plan and shows the form of the axle stays and head block brace. This piece is of flat or half round iron, as the builder may elect, and runs back on both sides of the reach almost to the rear axle. On top of the reach, at the front end, the stay takes the bolt in the center of the spring, which is really the king-bolt. It extends back a sufficient distance to take the bolts of the fifth-wheel brace. At the rear end of the reach a clip plate is fastened, with

end of the head-block and one in the reach will be sufficient to secure it firmly. Whether the fifth-wheel is home-made or not, the top and bottom stays are the same as shown.

The bottom stay, Fig. 6, is made with two braces, so as to have it strong enough. In the writer's experience the single stay is a source of considerable trouble, unless made so heavy as to be out of proportion to the rest of the vehicle.

The half front elevation, Fig. 3, shows how the spring is secured to the head-block. This method has the advantage of being easier to make and repair than a regular clip. The half back elevation, Fig. 4, illustrates how the springs are attached to the rear axle and also how they are fastened to the body.

The body is hung 37 or 38 inches at the back, and $\frac{3}{8}$ of an inch higher in the

front. The wheels are Sarven, 2 feet 10 inches and 3 feet 10 inches high, $1\frac{1}{4}$ -inch spokes, $1\frac{1}{4}$ by $\frac{1}{4}$ -inch round edge steel tire; the axles are $1\frac{1}{4}$ -inch half

block, while the sides will be equidistant from the edges of the wood. Of course, this will necessitate most of the hewing to be done at the top, but

too small, the axle will not have the necessary strength. It should fit the skein tightly or it will not be able to stand the test of endurance.

Whether or not it is best to paint that part of the axle that goes into the skein, is a question. As a rule, in making a new wagon, it is a good plan to paint it, but in repair jobs it is just the opposite, and there is a reason for this, as it will tend to work loose if the wagon is used before the paint has a good chance to dry. It often takes an astonishing long time for paint to dry when in a place of this kind and it has been found to be still fresh in the skein after years of use. If the paint is applied in a repair job and there is a gap left between the collar of the skein and the axle, the timber may be easily rotted, for water can then find easy access to the interior.

A Practical Talk on Pipe Bending.

EDWARD H. MURPHY.

There are various methods employed in bending pipe, but in each one the



Fig. 5. Fig. 6.
SHOWING DETAILS OF CONSTRUCTION.

main point is to prevent the pipe from collapsing or kinking. If the sides of the pipe can be prevented from bulging while bending, it will stop the top and bottom from flattening together; this can be prevented by bending the pipe

patent. The springs are $1\frac{1}{4}$ by 35 by $6\frac{1}{4}$ -inch. There are five plates in the rear springs and six in the front one.

The completed vehicle shown in Fig. 7 will give some idea as to the painting and lettering, though the designs and colors which can be used are almost endless in variety.

It is not within the province of this article to describe the various processes of painting. It is sufficient to say that a quiet and good looking combination of colors is to have the top rail a dark red; the next two panels Quaker green; the one with the address on, the same as the top, dark red; the body proper, green; the mouldings black and the lettering yellow (imitation gold), and the striping of the same color. The gear is a lighter red than the top and is striped $\frac{3}{8}$ -inch black, with a fine line of yellow on each side of the black.

Putting in a New Wooden Axle.

B. ROBLEY.

In a wagon shop it is generally considered a rather difficult job to put in a new wooden axle in the proper manner. The method explained in this article has been found a very successful as well as a very convenient one and if followed carefully, the job will not prove as hard as at first thought.

Well seasoned hickory or maple is the best timber to use. First remove the old axle. By heating, the skeins can be easily taken off. Then guiding yourself by the old axle, cut your timber to the proper length. In this connection it is important that you get the right pitch and gather. From the back side of the end of the timber, cut off one-half inch, and repeat the operation from the bottom side, being sure that this cut runs out at the inner end or collar of the skein. After this has been done, draw a circle at the end of the wood, making it the same size as the old axle and drawing it so that the lower side will reach the edge of the

this is essential so as to guarantee the proper pitch. You will recall that one-half inch has been cut from the back side of the block. This will give us the right gather, for it will throw the front side of the wheel in a little. It is important that attention be paid to this point, for while it may seem insignificant, still it has a great bearing on the wheel. For example, if there is no gather, the wheel will be inclined to spread out against the nut and naturally most of the wear will be in that direction. Again, the wheel will rattle, for the skein is tapered. On the other hand, if the wheel has been fitted with the proper gather, the pressure will be against the collar of the skein. In this case, the wheel, forcing itself against the collar or the wider end of the skein, will be perfectly tight.

To insure a good job in cutting the axle to fit the skein, care should be

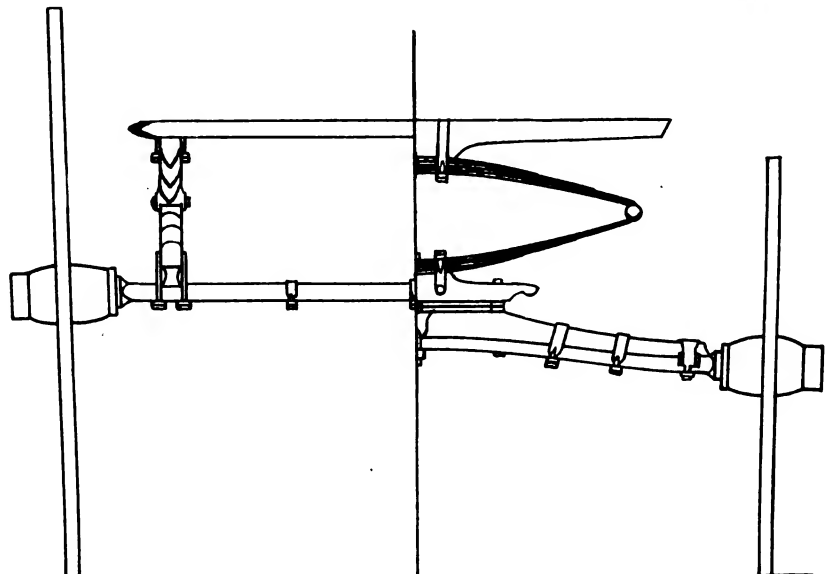


Fig. 4.—SHOWING HALF BACK ELEVATION OF RUNNING GEAR.

Fig. 3.—SHOWING HALF FRONT ELEVATION OF RUNNING GEAR.

taken not to cut away too much. It is better to go slow in this operation, for you can always cut away a little more; but if you get the block

between two flat plates, as far apart as the diameter of the pipe, and in many cases the jaws of a vise will be found very convenient for this purpose.

In bending long, heavy pipes the following method may be used: Heat the pipe at the part to be bent, support one end on a block and drop the other end repeatedly on the floor until the pipe is bent to the angle desired. Of course in this method the pipe will bulge at the bend, but this can be remedied by laying the pipe on the anvil and going carefully over the bulged portion with a flatter.

Another method of bending pipe and

must be exercised in this as in other ways to prevent the pipe from kinking.

Another way, not quite so common perhaps as the preceding method, but still practiced quite extensively, is to fill the pipe with sand before heating and bending it to shape. This method may be briefly explained as follows: Stop one end of the pipe with a wooden plug and fill up the pipe with sand, forcing a second plug or stopper into the other end. The pipe is then heated and

from flying up when the lever is pulled forward to bend the pipe. This last method is perhaps the handiest.

An Australian Shop and Wagon.

LOUIS MEZGER.

One of the engravings shown herewith is of my shop at Walkerston, Mackay, Queensland. The wagons shown are cane wagons, made so as to tip out the load of cane. They are much used by big farmers in conveying their sugar cane from their farms to the



Fig. 7.—SHOWING THE FINISHED VEHICLE.

one generally employed when several pieces are to be bent alike, is to make a former of two side plates and a block between them to give the proper bend to the pipe. To this is added a bending lever to force the pipe against the block between the side plates.

A common way of bending a pipe and one used by perhaps the majority of smiths is to place one end of the pipe in the hardy hole (if the pipe is not too large) of the anvil and pulling over the free end. Of course, the same care

bent. It is essential that the pipe be entirely filled with sand or it will be of very little use.

A common shape of pipe-bending former consists of a semi-circular casting with a groove which exactly fits half way around the pipe. A lever with a small wheel attached to it and having a groove similar to that in the casting is bolted to the latter and is used to bring the pipe to the desired bend. At one side of the grooved casting is a catch to hold the end of the pipe and prevent it

crushing mills, which in some instances are ten miles or more from the farm. These wagons will carry loads weighing from three to six tons.

The other engraving is one of my cane wagons in the act of discharging or tipping the load of cane at the mill, although the mill cannot be seen in the picture. The wagons are made similar to an ordinary wagon, except that they are fitted with two sets of summers. One set is fastened to the undercarriage and connects the front wheels to the hind

wheels; the other or top set is attached to the body which holds the load. The body, which is laid loose on top of the undercarriage, is made to slide back (on plates attached to top and bottom

The boxes and shaft should be warmed with a torch, or hot pieces of metal may be put on them. Put four to six pieces of thin cardboard or heavy paper between the boxes, letting the paper

much time would be lost if one had to be ordered and shipped. Take two pieces of wood, a little wider than the rim is to be, and hollow them out to not quite half the diameter of the shaft. Fit them tight, so that where the end of the wood comes to the shaft, bolts near the shaft are required to bring the pieces to the shaft. Put these pieces on the shaft and fit thin pieces of wood between them at the shaft and near the rim, where bolts are also put. Now revolve the shaft and from a rest mark on this hub where the shoulders for the rim and the tenons to go through the rim are to be. Now take the hub from the shaft, fashion the tenons and shoulders and put together on the bench, just as it was on the shaft, using the thin pieces. Saw the segments of the rim from dressed one-inch pine, strike a circle on the bench, the exact size of which the inside of the rim is to be, and put two of these circles together with screws. Now fasten this to the tenons of the arms. Continue to build up the rim, using nails or screws, keeping them well back from the face of the rim, and sink those for the last segments well into the wood. Work always from the inside of the rim, as the outside has to be turned off when the pulley is on the shaft, leaving the center crowning a little, as a belt always runs to the high place on the pulley. Fix up a solid rest to do this turning. The arms may be tapered towards the rim. If glue is also used in putting the rim together it will make a better job. Where care is used in the making of the



CANE WAGON DISCHARGING LOAD OF SUGAR CANE.

of summers) by means of a long screw and nut worked with a crank handle. The body is thus screwed back until it balances on the hind axle, in the same manner as a dray, and it is held there by two strong hooks and eyes. When the load is removed the body is brought back to its right place again by means of the said screw and nut and is held there firmly by means of four other hooks and eyes, the hooks being bolted to the top body and the eyes to the undercarriage. They thus work in and out of their places automatically. I do not think that these wagons are made or used in any other part of the world, except the sugar growing districts of Queensland and New South Wales. If any readers have seen or heard of similar wagons, I would be pleased to hear from them, and also the mode of construction, through the columns of THE AMERICAN BLACKSMITH.

Several Pointers on Pulleys and Shaft Boxes.

JOHN W.

When installing machinery in a shop having power, boxes for the shafting are sometimes wanted. When iron boxes are not at hand, boxes of maple or hickory can be substituted. These boxes may be babbitted if preferred, but if the pressure is heavy it is well to make these boxes a little longer on the shaft, if possible. In pouring the metal, a dash of oil or a small piece of resin should be put in the ladle just before pouring; this will make the metal run better and also prevent explosions. Still the utmost care should be taken that there is no moisture in the boxes.

touch the shaft and come back behind the bolts. These pieces can be added to if the boxes are too tight after pouring and may be taken out as the shaft and boxes wear. In most cases tissue or other very thin paper may be wrapped around the shaft to advantage, letting it lap $\frac{1}{2}$ of an inch, and putting this lap at the oil hole to insure the box taking oil good. The paper may be held in place by winding with fine silk or thread, and will be found of great advantage when the shaft has rough spots. Cylinder boxes for threshing machines should have heavy writing paper wrapped around them or they



MR. L. MEZGER'S SHOP, SHOWING CANE WAGONS IN FRONT.

are liable to heat. This very likely comes from the give of the wooden frame, as this cannot be as tight as the boxes in an unyielding frame.

Sometimes a pulley is wanted and

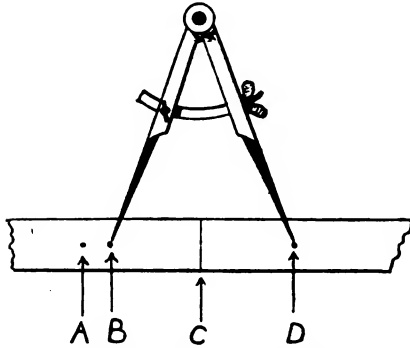
pulley, it will equal in practical results any that can be bought. If the timber of the arms is not well seasoned, the bolts must be screwed up as it dries, and if it should get loose, loosen the

bolts and pry the arms apart and put a strip of tin or other thin metal on each side of the shaft where the end of the arms come; screwing up the bolts will make it as solid as before.

How I Made An Emery Stand of My Circular Saw Machine.

JAMES H. JENSON.

Some time ago I had a chance to sell my emery stand and as it was too light for my work I let it go. But the grinding jobs kept coming in and I didn't



know what to do, as sickness in the family had made me short of funds. I had tried my wood lathe for grinding, but it vibrated too much. I then tried the iron lathe, but the speed is too slow. I then thought of the circular saw machine. I took off the saw, reamed out the hole in the emery stone and screwed the stone onto the sawing machine. I then started up my engine and found that my "new fangled" emery stand worked perfectly. I give this kink to the craft in the hope that it will save some other brother both money and space in the shop.

A Short Cut in Tire Setting.

L. VAN DORIN.

Let me tell you a little kink I have always used in resetting tires, I am surprised to find so many smiths who have not taken advantage of this kink when it affords so many advantages, as it means less work, quicker work and more reliable work.

The trick is not new, and yet I find it is not employed by many smiths—it is simply using dividers, after finding the difference in size between wheel and tire. The way I do is to get the wheel in condition for the tire, then with your tire wheel carefully get the size of the wheel; then run the tire carefully by commencing at the mark B in the engraving. When the point on the tire wheel comes round, locate a point at A, where another prick mark is made, showing the tire to be as much larger than the wheel in circumference as the distance between marks A and B. Then take your dividers (unless you have a

special tool for the purpose) and spread them sufficiently to mark off a space for heating and upsetting the tire. The mark D is located by setting one point of the divider at mark B, when the other point will locate D, where another prick mark is made. Now I make a chalk mark across the tire at C, so as to quickly see where I want to heat it. After getting the tire in this condition, I hang up the tire wheel and go to upsetting the tire. When the tire is finished the points of the dividers should stand in marks A and D. The heat that gets into the tire expands it more or less and yet it has no influence on this method of measuring. You can see very easily that it is much quicker and easier to pick up the dividers than to lay the tire down and run the tire wheel around it every time you strike it a few blows with your hammer.

On Which Side are You?

The world of today is provided with a certain number of persons who are continually seeking something new or a new method of doing something old. They are under the impression that everything is in need of improvement and are continually endeavoring to get others to try these new ways. Ofttimes it is the monetary interest that influences these individuals to champion the cause of improved machinery and tools and seldom do we find a person advocating improvements solely for the benefit of a craft or industry. This condition is more prevalent in some crafts than in others and it is very gratifying to note that the blacksmiths as a body are very liberal in exchanging new ideas and that they are tending to be more so, every year.

On the other side are the individuals who feel positive before a thing is tried, that it "won't work." They very seldom think of new things themselves and, of course, object more or less to the new ideas of other people. They are the narrow-minded, short-sighted class, who declare: "What was good enough for grandfather is good enough for me." There are many concerns, both large and small, that could and would do a much larger business if their equipment were up-to-date. We have in mind at present, a manufacturing concern which has built up an immense trade, but refuses to install labor-saving and up-to-date machines. The work they are called upon to do is far greater than that which they can possibly turn out and consequently much trade must be turned away. It is hardly necessary to say that this concern still occupies the

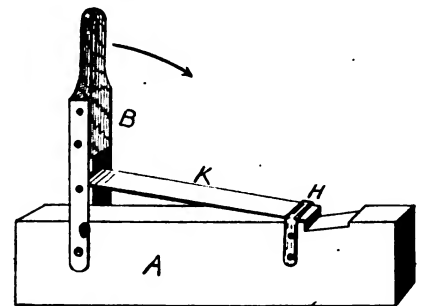
same premises and have undergone no improvements since their establishment some ten or fifteen years ago, notwithstanding the fact that many important changes and numerous improvements have taken place in their branch of the industrial world. In conclusion, we refer you to the heading of this article; is it necessary to comment upon which side you *should* be on?

A Handy Tool for Cutting Wedges.

C. H. STRADLEY.

The accompanying illustration gives a fairly good idea of a wedge cutter for making wedges to be used in carriage and wagon work. The base A, of this cutter is a piece of hard wood $1\frac{1}{2}$ by 3 by 14 inches, with a notch in it 2 inches from the end, $\frac{1}{2}$ inch deep at one side and $\frac{1}{4}$ inch deep at the side nearest the end of the wood. This notch is two inches long. The knife K, is made wood-chisel shape and is 10 inches long and as wide as the wood base A. I made the knife on my cutter from an old buggy spring, using the eye in the spring to fasten it in the lever B; the other end of the spring is sharpened. The lever B, is made by bolting two pieces of flat stock, of any convenient size, to a piece of wood, which serves as a handle. This is then bolted to the base, after attaching the knife. At H, is a clevis to hold the knife down and prevent it from slipping sideways while cutting the wedges.

To use the tool, split some blocks to about $\frac{3}{8}$ of an inch thick by $1\frac{1}{2}$ inches



A HANDY TOOL FOR CUTTING WEDGES

long and as wide as the wedges wanted. Now screw the tool in a vise, place a piece of split wood in the notch and with the left hand work the lever while using the right one to handle the wedges. When using the tool, the knife must be pushed forward far enough to cut entirely through the piece of wood which is placed in the notch.

This device is especially convenient for the craftsman using many wedges and in a half-hour he can produce enough wedges to keep himself supplied for at least six months.

Gentleman Jim.

DANIEL O'CONNELL.

In the Diamond Shaft worked Gentleman Jim,
 Handsome of face and stout of limb,

Coarse of dress, but something in him,
 Whether down in the coal mine, soiled and grim,

Or wandering alone in holiday time,
 Won the love and respect of all in that clime.

He had no sweetheart, he had no wife,
 Some mighty sorrow had dimmed his life—
 His earnings hardly won and small,
 Were aye at the orphans' and widows' call—
 Of those who had perished in shaft or winze,
 He was the friend of all living things,
 And moving along in those toilsome ways,
 He wore the demeanor of gentler days.

On April last, when the mine fell in,
 Beneath the timbers stood Gentleman Jim;
 With a giant grasp he flung two of the boys
 Clear of the danger—with deafening noise
 The shaft gave way on every side;
 The boys were safe, but Jim—he died;
 Died as men die, and will die again,
 Giving their lives for their fellow-men.

When rocks and timbers were cleared away,
 And Jim borne up to the light of day,
 They took from his bosom stained with blood,

Two withered leaves and a withered bud
 Pinned on a card, "Toute à toi—Marie,"
 Was written beneath them; beneath it he
 On this relic his heart for years had worn,
 Had written, "All withered—except the thorn."

What life romance, what story of wrong,
 This man had locked up in his soul so long,
 None who loved him may ever know;
 But the tale of his glorious chivalric deed
 Shall not perish as long as man hold his creed,—

That the hero whose blood for his kind is shed

Wins a deathless fame and an honored bed;
 A monument grander than sculptor ere gave,

In the glory that halloed the martyr's grave.



March—the lion or the lamb?

Drive those nails at just the right angle.

Three weeks more—then first call for spring.

Don't delay about making repairs to your tools, machinery or the shop just as soon as they become necessary. A stitch in time, you know.

A suggestion—A large wholesale house recently posted the following sign in their sales dept.: "Our credit dept. is on the roof—take the elevator."

Hark, hark, the little dogs bark. Take no notice of it, when the Cheap John workman tries to run you down. It is really a good advertisement for you.

We are still harping on side lines for blacksmiths. Look alive for opportunities

to increase your earnings—unless you don't want to make any more money.

A cooking pot was the first iron casting made in the United States. It was moulded in Massachusetts in 1642 at a small blast furnace, using charcoal for fuel and oyster shells as a flux.

Kind words never die—so said the poet of old. Did you ever stop to think that a pleasant smile, a neatly arranged shop and a job well done is a trade-winning combination that seldom fails?

Thomas T. did no work on Thursday last. No, it was not a holiday, and many customers came to shop only to be turned away. Mr. Tardy spent the day trying to patch up his ancient bellows.

A job worth doing is a job worth doing well. Don't let your customers kick about high prices. Turn out a class of work that will please, regardless of the price. Do your best every time and there will be no kick coming.

Don't send checks on local banks for payment of small out-of-town bills. The exchange eats a big hole in these small checks. Remit rather by money order, express order, registered letter or postage stamps, or send a New York draft.

A giant electric sign is displayed on the new Butterick building in New York City. It consists of a single word in enormous letters, one of them nearly six stories in length, the whole sign said to be the largest electric device of the kind that has ever been displayed in the world.

Be an early bird. Study your opportunities for getting ahead of your competitors. In this twentieth century, as never before, progressiveness pays. Can't you figure out some way of stealing a march on your trade rival and get a larger share of spring trade?

One of the best smith shops we have seen in York State had in one corner of it a neat box arrangement, where the proprietor kept on file the latest catalogues from all firms from whom he bought goods, or who made tools usable in his business. It struck us as a splendid idea.

A great many orders have come in to us for lots of fifty calendars, after the last one was gone, in spite of the second large installment of them that we made up. If too late this time, be sure to get your order in early next year. September first is none too early to engage your supply.

A letter from Paris addressed to Berlin reaches its destination in an hour and a half, by way of pneumatic tubes. The distance is about 600 miles. This system is being tried experimentally in the United States for mail matter and small parcels, and has much of promise in it for the future.

A weak link exists in the business of many a man. Can you find any weak link in the chain that brings the dollars into your pocket? Poor tools, inefficient helpers, expenses too high or collections not followed up,—these or other things may be weak links threatening failure of your business chain. Now is the time to seek and mend.

Don't let up on your advertising. If things are coming your way, advertise to keep them coming. If they are not, advertise to get them started in your direc-

tion. We assume of course that you are doing some advertising, if only in a small way. A successful smith must be a business man, and a successful business man must be an advertiser.

Boiler shops are the noisiest and blacksmith shops the coldest places on earth, according to some people. But many smiths provide heat for their shops in winter, both for their own comfort while working and their customers' comfort while waiting. Did you resort to any new method for warming the shop during the cold months just past?

Thank you, very kindly, says THE AMERICAN BLACKSMITH to each reader who secures a new subscriber to the paper. We appreciate it. But then, too, we extend your subscription six months for each new reader you get us—a liberal commission, is it not? It is a good plan to send in one or two new subscribers when you renew your own subscription. A host of readers have already done so. Why not you?

In the past few years we have been able to detect a growing tendency on the part of smiths towards the use of better stationery and the like. Few craftsmen nowadays are content to carry on their correspondence on any old scrap of paper that happens to hand. He must have a neat printed letter head. And the number of blacksmiths who use typewriters would surprise anyone not acquainted with the progressiveness of the craft. 'Tis a most encouraging sign.

Deaf, dumb and blind. Worse than this even is the man who refuses to heed the advantage to him of co-operation with his brother craftsmen. A rational smith always carefully weighs the arguments pro and con before he rejects a proposition. And when it comes to co-operation among the blacksmiths of a locality for better prices, better collections, better feelings and conditions all around, what arguments can be raised against it compared to those in its favor?

Here's a request from the publishers: If any reader feels that he has grounds for a complaint of any kind about this paper, let him report it to us at headquarters direct. We would rather straighten out one hundred "kicks" than to have one dissatisfied subscriber depart from the big family of AMERICAN BLACKSMITH readers without telling us the trouble and giving us a chance to straighten it out. But, glad we are to say, complaints are few and far between, and still fewer would there be if only subscribers would notify us promptly of any change of address.

Speaking in meetin'! No smith need hesitate to write out his views upon any craft topic for publication in these columns. If you have a useful home-made tool, if you are doing a job in a better way than you find described in some issue, or if you wish to criticize some statement made in the paper, write out your thoughts upon the subject and send us. We welcome every such communication, no matter how short or apparently unimportant. Make it a rule to send in an item or an article, a list of prices or a photograph of the shop at least once a year. And right now is a good time to put the rule into force.

American Association of Blacksmiths and Horseshoers.

That the blacksmiths of the United States have, of late, been realizing the manifold advantages of organization is clearly demonstrated by the numerous county associations which have recently sprung up in various vicinities throughout the country. In every case the members of these organizations are very enthusiastic over the results of this movement, which are already apparent, for, naturally, one of their first steps was to draw up a new code of prices, advancing the old list so as to demand what they consider just compensation for their labor. In most instances these prices have been printed on large display cards and hung in conspicuous places in the shops. This is indeed a very wise move, for as soon as a customer enters, the price list tells him that the smith is a member of the county association and has adopted the association prices. As a rule, there are but few in the county who will not join—if not at the outset, then surely as soon as the advantages of membership are made clear. Thus in a comparatively short time blacksmith customers find these prices in vogue in most every shop in the county and are compelled to pay them, whether it be against their will or not.

If your county has not already organized, it is high time that you started a movement so beneficial in its results. Success is inevitable. Every right minded man will endorse the idea and every smith who has his own welfare at heart, as well as that of the craft in general, will be glad to lend his assistance. No time of the year is more propitious than now to start the ball rolling. Spring is coming and with it good roads. Meetings can be conveniently attended then, and the smiths of your county should be alive to the opportunity of organizing at the earliest possible moment. Every day that you hold back means a loss of money to yourself and to your fellow craftsmen. You cannot act too quickly, for surely the prices smiths are getting for their work, are not what they ought to be. However, the better price movement is but one of the thousand advantages to be derived from organization. Losses of all kinds, which the smith can ill afford, including bad debts, etc., will be less numerous and a general improvement in all conditions will be accomplished.

The association will be glad to furnish any progressive smith with the plans of formation and the general outline to be

followed in starting a county organization. We will tell you how it has been done in other places and map out a plan of action to fit the conditions of your particular vicinity. Address a letter today to Box 974, Buffalo, N. Y., telling us that you would like to see your county organized and by return mail we will forward you our plans. Don't delay your action, for you should have been getting better prices for your work long before this.

The Lien Law Movement.

At the present time the most important work demanding the immediate attention of the Association is the movement for securing State lien laws which will permit a smith to place a lien or claim on horse or vehicle in order to secure payment of his bill. For years the Association has been advocating legislation of this nature, but never before has the matter met with such popularity. Not only has the bill already been introduced in many of the State legislatures, but more than this, the outlook for the passage of them is decidedly encouraging. This condition has only been made possible by the earnest co-operation of the blacksmiths throughout the country. A goodly number of the smiths have already written to their representatives in their State legislature, urging them to support the bill when it comes to a vote. As a result, the legislators realize that the blacksmiths and wagon-makers firmly demand the passage of the law and naturally they are working towards that end.

If your legislature meets this year, why not start a lien law movement in your State? At your request we will gladly co-operate with you, using our greatest influence in getting the bill passed. The many advantages which a blacksmith's lien law affords, should spur you on to prompt action. Interest yourself immediately in the matter. Then get your brother smiths interested, securing their promise to write to their representatives, and in this way you will have started a movement the results of which will be of unlimited value to the smiths of your State.

The New York State Lien Law.

New York is one of the States in which the lien law has been introduced this year. On Jan. 30 Assemblyman Robert Lynn Cox advanced the bill to the New York State legislature and it received a most hearty welcome. However, we wish to remind the blacksmiths of the Empire State that if this bill is to be passed we must have the support

of every member of the craft. Two letters is all that is required on your part. Send one to your State Senator and the other to your Assemblyman, urging them to support the bill when it comes to a vote. Surely a bill with such far reaching effects merits at least this much effort on the part of every man, and if you do your share we will be crowned with success. Write your letters today. Send them to Albany before the bill comes to a vote.

The Nebraska State Lien Law.

Recently Hon. A. E. Cady introduced a blacksmiths' lien law bill in the Nebraska State legislature. It seems that the smiths of this State have taken hold of the matter with great interest and enthusiasm and are quite confident of securing the passage of the bill. However, the same co-operation is necessary in this case as urged above, and we hope that every wide-awake Nebraska blacksmith, who may be fortunate enough to read this article, will without hesitation act as requested. If the blacksmith will but consider for a moment the protection which a law of this nature affords him, we are confident that he will readily offer his hearty support. If not for your own sake, then for the good of the craft, let every man do his duty.

Appliances for Handling Heavy Work.

W. B. REID.

For the successful manufacture or repair of heavy locomotive forgings the proper appliances for handling the same are indispensable. First in importance is, of course, the crane. These are made in many designs, of wood or iron, as fancy may determine. The chief consideration in every case should be strength and stability, combined with facility of quick and easy movement. The outline of the crane shown in the engraving, Fig. 1, is in no way intended as a model, but simply to show its adaptation to the supplementary apparatus, for the welding of heavy frames, attached to it. The engraving shows the ordinary over-head trolley of the crane removed, and a temporary, stationary pulley substituted. A chain passing over this and a similar pulley at the rear end of the crane balances the heavy fire-box frame, suspended in the yoke, by means of a number of weights attached to the end of the chain. These weights consist of round cast iron discs of various sizes with a slot in them, as shown, to permit their easy placement or removal as required for balancing. The frame can be placed in the yoke,

or removed from the same, without the removal of the weights, by simply suspending them from the small hook, shown at H.

The yoke is of very simple construction. The overhead cross beam Y has a number of holes at each end to admit of adjustment to different widths of frames. Two hooks of $1\frac{1}{2}$ -inch rods, suspended from this beam, hook onto

1, shows a mud ring in the yoke prepared for welding by the two common forms of scarfs—the V and the male and female. We prefer the latter and would weld both ends in this manner, using a turn buckle X, Fig. 1, to pull the parts together when at a welding heat. When welded with the V scarf the frame would be braced by a block of wood bound between the parts with a

wheel measures 40 inches in diameter and is made of 3-inch angle iron with cross braces of $3\frac{1}{2}$ -inch by 1-inch iron. The manner of its construction is made very plain in the engraving, Fig. 2. By adjusting this wheel to the center of gravity on the frame, a perfect balance can be secured without any weighting whatever. This wheel, in handling frames, is used with the ordinary

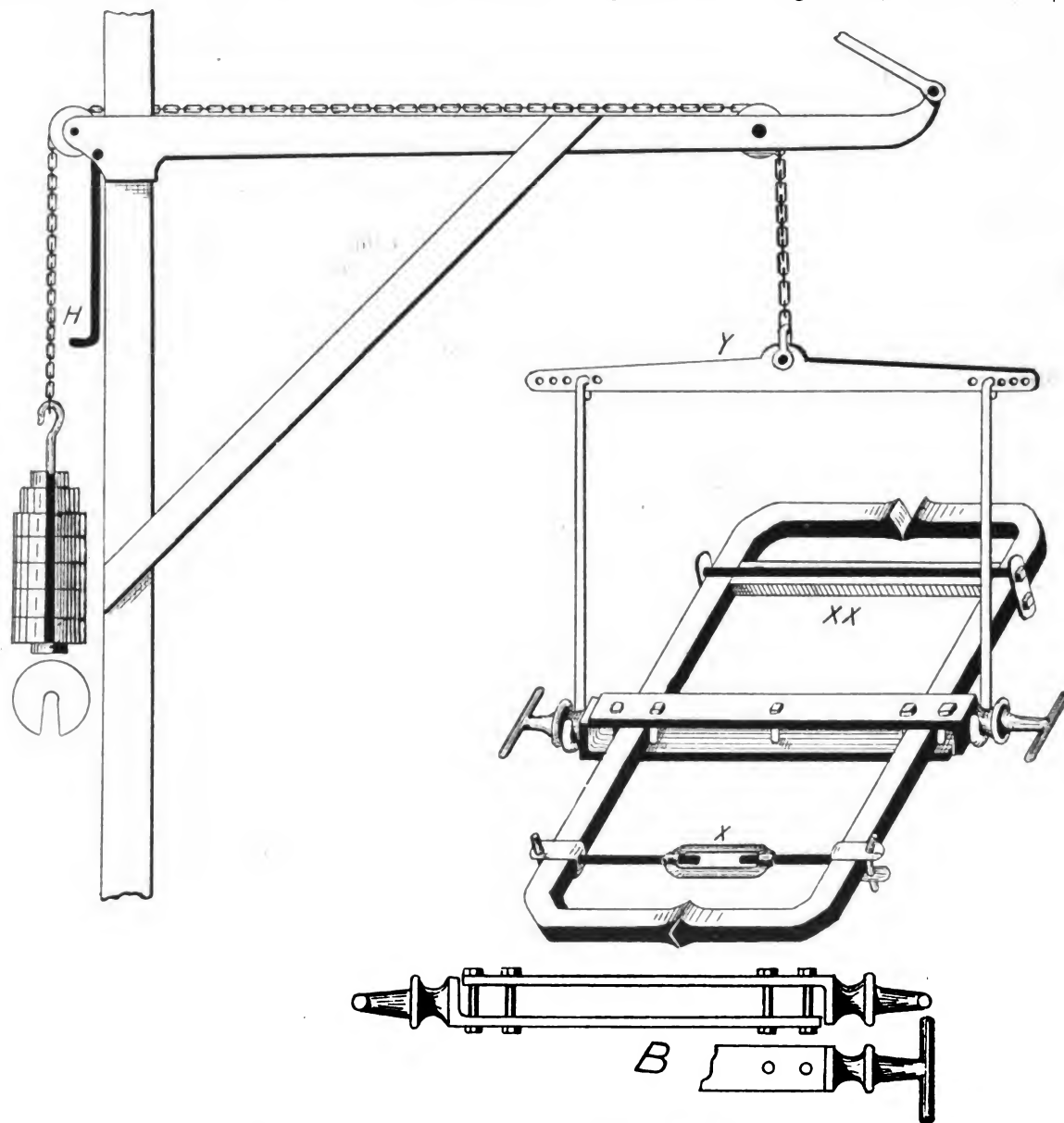


Fig. 1.—APPARATUS FOR HANDLING HEAVY FRAMES AND FORGINGS.

the cross brace of the frame below. The construction of this brace will appear plain from the engraving. It is made of 5-inch by 1-inch iron. The ends are forged as shown at B to ensure the perfect balance of the frame which revolves lengthwise through the yoke, being at the same time raised or lowered perpendicularly at pleasure, by means of the chain and balancing weights.

When the working parts are kept well oiled both movements can be quickly and easily made. The illustration Fig.

couple of rods threaded at both ends as at XX, Fig. 1.

For welding wide or narrow truck frames these appliances are also very useful. Fig. 2 shows a wheel in common use for handling locomotive frames. Their usefulness, however, is generally impaired by being made too small, necessitating the balancing of the frame with heavy weights. This can be avoided by making them of larger proportions. A finely proportioned, light yet strong wheel is shown in Fig. 2. This

suspensory arrangement of crane

In the locomotive contract shop the writer has successfully used a wheel of this kind for handling heavy locomotive mud rings of the narrow 42-inch class. In this case the mud ring, being revolved sideways instead of lengthwise, as in Fig. 1, enables the operation to be done much quicker and easier, a point of some importance in heavy welding.

The wheel can be used with the weight balancing arrangement or with the ordinary chain block. Being in this

instance of so large a diameter, the lower half of the wheel will strike the ground before the frame reaches the level of the anvil. This may be very easily overcome by slightly tilting the anvil and working the frame at the same inclination.

Another Method of Pointing a Plow Share.

HARRY RUSH.

For ordinary pointing use 7 by $\frac{1}{4}$ -inch plow steel, cutting it to about $2\frac{1}{2}$ inches wide at one end and $1\frac{1}{2}$ inches at the

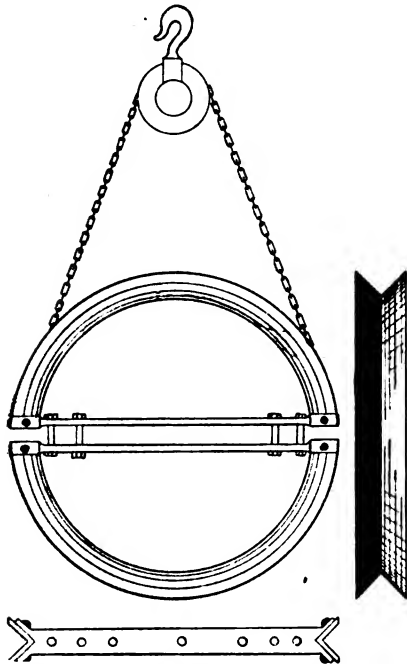


Fig. 2.—WHEEL USED FOR HANDLING LOCOMOTIVE FRAMES.

other. Next split the wide end down about two inches, as shown in Fig. 1, A, bend the split ends in opposite directions and draw out, as shown at B. The wide part is made sharp on the inside for the throat of the lay. Draw the other end of the point, as shown at C, and sharpen about half way down on the inside. Now bend the point of the lay around, so that it is straight on the landside, bend the point in about the middle and put it on the lay after heating both. Now fit the point down close all around and hold with a pair of light tongs for the first heat. With a little practice the next heat will finish the welding.

Lays that are badly worn on the bottom of the landside should be built up before the point is put on, by laying a piece of $\frac{1}{4}$ -inch square stock on the bottom, as shown in Fig. 2 E, and then pointing as before. Fig. 2 F shows the finished lay.

The Dressing and Tempering of Stone Hammers.

W. P. WOODSIDE.

In heating a stone hammer for forging do not hurry the heating, but turn the

hammer over in the fire quite often and use a very gentle blast at first. Heat it evenly and thoroughly until it is bright red, not a yellow, but very near it. Stonemasons' hammers are generally made of low carbon steel and will therefore stand considerable heat. If the face of the hammer is rounding or the corners are broken off, trim with your hot chisel, and upset the face a little. Now use your flatter and with fairly heavy blows, shape up the sides and edges until they are sharp and straight, leaving the center of the face lower. Having done this, heat the hammer to a very low red and lay it down to cool. After it has cooled off entirely, reheat it to the hardening heat, which will most likely be a medium red. Now in taking this heat use very little blast at first or you will heat the corners too quickly; that is, the corners will be at the hardening heat while the center is still black. This is the cause of a great many hammers being full of semi-circular cracks around the corners and of the corners flying off the first blow or two that is struck with them. Heat the hammer, slowly and evenly, to a medium red heat and plunge it into the hardening bath, leaving it there until entirely cold. I very seldom draw the temper and if I do, it is never below a light straw color. If you wish to draw the temper, it can easily be done while heating the plain end for hardening. I draw the temper very slowly in the plain end. This thin end will not stand so hard as the heavy one, so if it is a hammer that I think does not need the temper drawn in the heavy face, I draw the thin end

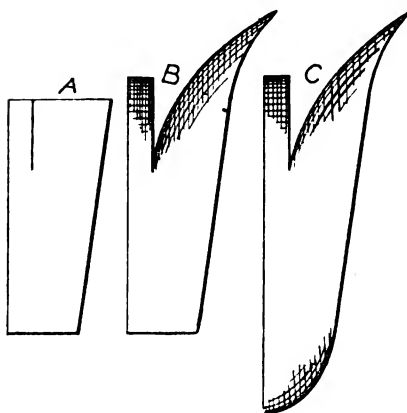


Fig. 1.—SHOWING METHOD OF PREPARING PLOW POINT.

to a slight straw color and if it is a hammer of which I draw the temper in the heavy face, I draw the plain end to a dark straw color.

The reason I draw the temper slowly is to give the cutting edge good backing so that it will not crush down under

heavy blows which would no doubt occur if you drew the temper fast. In forging the plain end, first forge down fairly thin and then bring the edge to a quick bevel.

The Care of the Gas Engine.

J. VESTAL.

There are a number of little things which might happen to a gas engine, which must be looked after. An oil cup may run dry or get stopped up, a lock nut may work loose on a valve stem and if not looked after may wear off the cotter pin above it and let the valve drop into the cylinder. An igniter wire

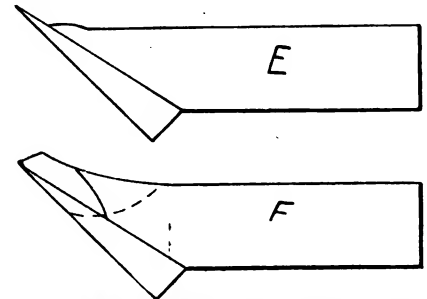


Fig. 2.—BEFORE AND AFTER HAVING APPLIED NEW POINT.

may work out of the terminal nut and become grounded, thereby shutting down the engine. This last would not happen if the set screw in the terminal had been clamped down on the wire. A trip stem may work loose, so as to prevent contact between the points of that igniter, thus causing the charge to miss fire. Or it may move in the opposite direction until it allows the points to remain permanently in contact, thus short circuiting the other igniters and causing a shut down. Many a small cause may be remedied while running. An exhaust valve may leak and need grinding, an igniter may become grounded by moisture or carbon. A battery may become exhausted and need renewal; a bearing may need keying up. Back firing is the ignition of the explosive mixture before it has entered the cylinder. You always get a book of instructions with all engines. You must study it and study the engine also and you will soon become acquainted with every part and will have no trouble. The oil will not cost half what a fireman costs to hold steam on a boiler, besides waiting for steam to be raised. The best size is five or six horse-power. You may think a $2\frac{1}{2}$ horse-power will do, but you will keep adding one machine after another, till you will need the six horse-power and then you will have a $2\frac{1}{2}$ horse-power engine for sale and it is hard to sell a small power second-hand engine, although some firms may take it in

part payment for a larger engine. However, much time and money will be saved if you purchase a large engine.

Forging a Step-Pad for an Axle Nut.

C. H. RICHARDSON.

Take round stock the size of the collar on the nut; allow in length of stock the diameter of the iron for the pad,

about one and one-half as large as the body of the iron) for the nut. Now weld and true up to fit the nut, finish pad as previously spoken of, and dress up the nut with a file. Shrink the step socket on the nut, drill two $\frac{1}{4}$ -inch bolt holes (one in each side at X and Y), screw in bolts and saw them off flush. This will prevent any give to the socket

promptly removed, serious swelling and acute lameness may result.

Causes.

Among the causes of interfering behind, as in front, the most common is defective conformation of the limbs, overwork, the horse being leg-weary from loss of condition, pain in the feet or legs and improper shoeing.

Treatment.

In the treatment of interfering front or hind it is obvious that the most important point is the discovery of the cause, for it is useless to try to prevent a horse from interfering by shoeing when the cause of the trouble is overwork or loss of condition. Now, there are well-defined methods of shoeing for various defects in conformation of the limbs, but occasionally an isolated case will upset all our accepted theories and calculations. The case in point is just one of these exceptions to the general rule that we find occasionally.

I recently had a large gray horse brought to my shop interfering behind, striking one fetlock only, and since I could see no fault in the conformation of the limb, and the shoeing was apparently all right, it resolved itself into a difficult problem. The animal was a picture of equine beauty and the owner told me he had tried in vain to remedy the trouble and the horse had always worn a boot on the injured fetlock. He is about seven years old, and is used for driving and riding and is in the pink of condition. I took off the shoes and

Fig. 1.—FORGING A STEP-PAD FOR AN AXLE NUT.

about one inch for the square of the nut and add the thickness of the collar of the nut. We have now marked on the bar all the stock required for the job.

Now, with a sharp chisel, cut the bar nearly through, leaving enough to hold it. This cut will form the face of the nut, A, Fig. 1. Now, with a sharp fuller break down and form the square of the nut. Then break down on three sides for the neck or round shank of the pad, finish this up to nearly the size in diameter and about $\frac{1}{4}$ -inch short of the length desired. Now flatten the remainder of the stock B for the pad, find the center of it, lay off with dividers and finish up. Fig. 1, C, D, E, shows views of the finished nut and pad.

The only objection to this plan in a small shop is the cutting of the thread, although it would be a small task in a machine shop.

Plan No. 2 is a much more complicated way of forging the nutstep, and will not give as good results, but I think it will be the most desirable way in a shop where it is necessary to save the nut.

To forge this, I would start as shown in Fig. 2, A. That is, starting about four inches from the end and with the fuller work out the shank. Next, flatten the four inches at one end and punch a small hole far enough from the end to allow for the width of the nut when bent back as at B. Now draw the ends and bend the corners to form a socket (at all times, when drawing iron to be bent any angle, I leave the spot to be bent

if it is properly fitted. Fig. 2, C, D, E, shows views of the nut socket and pad before shrinking on the nut.

A Remarkable Case of Interfering Behind.

E. W. FERRIN.

Interfering behind (ankle hitting) is very common, and consists in the animal striking the inside of the fetlock or ankle with the hoof or shoe of the opposite foot. In driving horses that interfere behind it is common to see

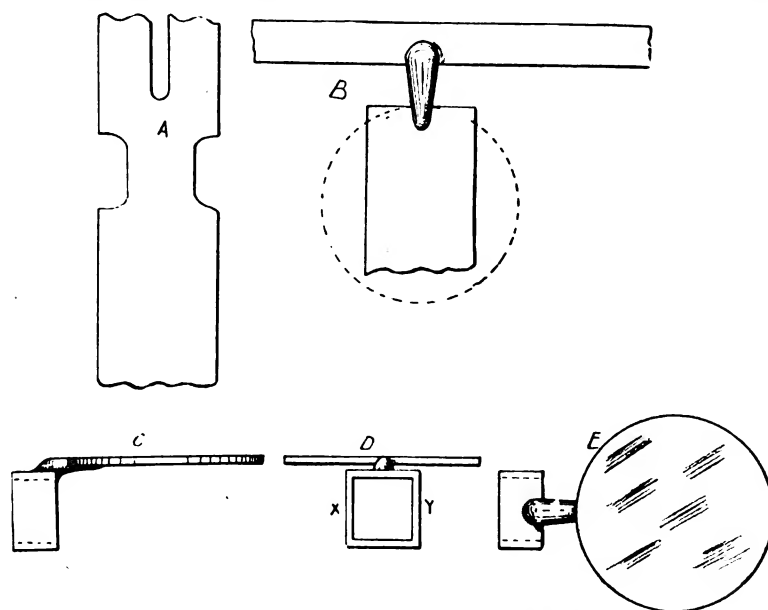
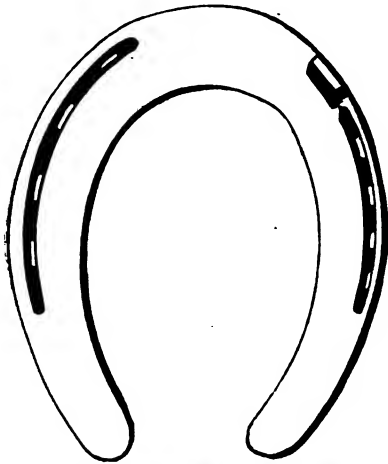


Fig. 2.—ANOTHER METHOD OF FORGING THE STEP PAD.

them go on three legs, carrying the injured limb, like a lame dog, for some distance, and when putting the foot to the ground there may be some lameness, and if the cause is not very

examined the feet, but could not detect any fault. Obviously the cause was there, but since I could not discover it, I was driven to the expediency of a series of experiments based upon vague

abstract theory which proved unreliable, for I discovered the remedy by a mere accident. I tried a high inside, an outside weight, spur on the outside heel, and a high inside toe, but all without the least improvement. Then I thought I would try a high outside toe, so I took a pair of light steel shoes, the right size and welded a toe calk on the outside toe of each shoe just covering the toe nail hole, as shown in the engraving,



A REMARKABLE CASE OF INTERFERING BEHIND.

but without success. When the shoes had been on but a few days the owner took a drive in the country and came back with the outside half of one shoe gone; it had broken off at the nail hole just where the toe was welded on. The owner said: "I thought he would be lame before I got back to town, but it seems to me he traveled better." This gave me the clue. I examined the hoof and found it worn a little on the outside and the half shoe remaining on, made that foot somewhat high on the inside while the left foot (the one with which he had done the striking), was high on the outside toe, and on a close examination of the boot, I saw that it had not been recently hit. These facts and the marked improvement in his going, as noticed by the owner, suggested the idea that one foot had to be high on the outside and the other on the inside, so I pulled off the half shoe and put on a plain shoe of the same weight with the inside of the foot a little high and rolled at the outside quarter, and left the other shoe on with the toe calk welded on the outside toe with the happy result that he has never hit since, so now we always shoe him with a plain shoe, high on the inside, rolled to the outside quarter on the right, and plain shoe with a level foot and a toe calk on the outside toe of the left foot. With the above method of shoeing I was very successful in treating the animal, and I

am glad to say that the horse now travels perfectly clear.

Handy Pair of Tongs for Holding Plow Shares.

L. E. PHIPPS.

The engravings show the plow tongs I use for holding shares while welding. A shows the tongs in use. B shows how this tool is made. C is a piece of good iron stock $1\frac{1}{2}$ by $\frac{1}{2}$ inch and as long as necessary to bend as shown. D is the handle of this part, it is $1\frac{1}{2}$ by $\frac{1}{2}$ inch and tapers toward the hand. It is welded onto C. E is the other handle of the tongs and is forged at one end so as to fit on the back of the bar, as shown at X. This is a very handy tool and can be used to great advantage in plow work.

Diseases of the Foot—Causes, Symptoms and Treatment—7.

W. O. JULIUS.

Laminitis.

Laminitis is an inflammation of the sensitive laminae. It may be caused by concussion, over exertion, exhaustion, rapid changes in temperature and ingestion of various foods.

The first symptom of the disease is usually interference with locomotion and as the lameness develops, the pulse quickens and becomes full, hard and strikes the finger strongly. The temperature then rises several degrees and the respirations become rapid and panting in character. The animal's facial expression is anxious and indicative of the most acute suffering, while the body is more or less bedewed with sweat. The thirst is greatly increased, but the appetite is weak and in many cases lost entirely. The affected feet are dry and hot and when they are tapped with the hammer, the most intense pain is caused.

Liability to affection varies in the different feet, according to the exciting cause. Although the disease appears more often in the fore feet than in the hind, any one or more of the feet may become affected. The fore feet receiving most of the weight of the body and the hind ones being almost free from concussion, is what makes this condition possible.

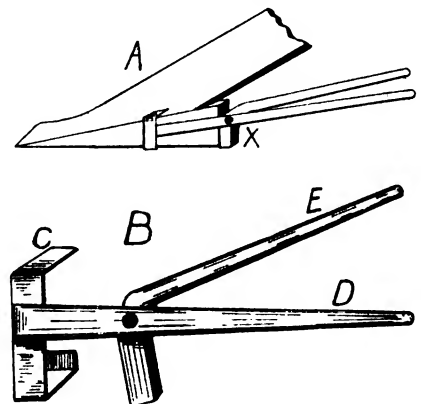
For convenience in considering the different stages of laminitis we will dwell upon each separately. *Simple congestion* of the laminae, many times erroneously called laminitis, generally requires but one to three days for recovery and is usually but moderately severe. However, this condition may develop into true laminitis.

In the *acute* form of laminitis the

symptoms may all develop rapidly or the disease may commence with a slight soreness in the feet, which in a day or two may develop into a marked case. These acute cases usually run their course in from ten to fourteen days. However, a culmination of the disease may be reached in from three to five days, if the horse is properly treated. The *sub-acute* form of laminitis is usually a termination of the acute form, although it may exist independently or even precede an acute attack.

The term *chronic* laminitis is used by many to designate the advanced stages of the *acute* and *sub-acute* forms of the disease. True chronic inflammation of the laminae is most frequent in animals that have long done fast track work, but it is seldom met with among the working horses. As in other chronic inflammation, there is a strong tendency in this disease to develop new connective tissue, whereby pressure is exerted upon the blood vessels, thereby interfering with nutrition.

Complications which are many and varied may arise in connection with laminitis. These may be mentioned in the following connection: *Excessive purgation*, which is one of the simplest of these complications, is not usually attended with dangerous consequences although it may prove dangerous to the patient and even cause death. *Septicemia* and *pyemia* are unusual complications and seen only in the most severe cases. The animal usually dies within a few days after showing signs of the complication. *Pneumonia* is another complication, although it may be entirely overlooked. Examinations of the



A HANDY PAIR OF TONGS FOR HOLDING SHARES.

chest should be made every day, so as to detect the disease at its start and to render prompt aid. *Sidebones* is a complication which may develop very rapidly, but as it is seldom met with, we will merely mention it. *Suppuration* of the sensitive membrane is a

complication somewhat common and even in its limited form is always a serious matter; but when extensive and especially when it extends to the periosteum, the results are apt to be fatal. *Peditis* is a term applied to that complication which not only involves the laminae, but the periosteum and the coffinbone also. *Gangrene* sometimes occurs in conjunction with laminitis as the result of excessive detachment from the bone and compression resulting from excessive exudation. *Pumiced sole* is a condition in which the horny sole near the toe crumbles and leaves the sensitive tissues more or less exposed. It is not only seen in conjunction with laminitis, but is also observed under other conditions.

Treatment.

The treatment for laminitis is perhaps more varied than in any other disease, and what would be good in one instance may be disastrous in another and that which is gentle work in one case may incite disease in another. But, notwithstanding these difficulties, there are some general rules to be observed that will in part serve to prevent the development of some cases. First of all, the causes must be removed, if possible. All conditions that are liable to excite the disease should be reduced to a minimum. No sudden changes should be made, as from very light to very severe work, from slow to high temperatures or vice versa. Care must be exercised to clothe the animal

held and horses that have never been fed upon Indian corn should receive but a little at a time. When the animal is very lame in one foot the shoe of the opposite limb should be removed and cold water frequently applied to the well foot.

In cases of simple congestion of the laminae, the body should be warmly clothed and warm drinks given. The feet should then be placed in a warm bath for about an hour, when the feet may be changed to cold water until recovery is complete. In acute laminitis the curative measures consist of large doses of nitrate of potash and the continued application of cold water to the feet and ankles. Cold water maintains the vitality and disease-resisting qualities, keeps the horn soft and moist, and acts directly upon the inflamed tissues by reducing the temperature. The shoes should be removed in the early stages of the disease and no paring of the hoof allowed.

Where suppuration of the laminae is profuse, it is better to destroy the animal at once, and relieve its suffering, than to attempt to establish a cure, but in cases where the suppuration is limited the treatment as advised for acute laminitis should always be tried and may induce recovery. Where the animal persists in standing or where constantly lying he should be placed in slings. In conclusion, the animal should not be returned to work too early else permanent recovery may never be effected.

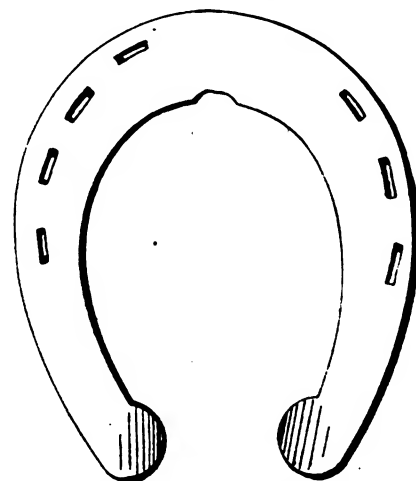
The Making and Use of Stick Calks.

FRANZ WENKE.

During the winter there are more or less horseshoes used with calks. Some are simply welded on while others are screwed in. But I have never found any so called stick calks. There may be some used on this side of the Atlantic, but if there are I have never seen them. My brother blacksmiths, especially those from the German Cavalry, Artillery or Train, will remember that some twenty years ago we used stick calks in a great many of the regiments, if not in all. The following is the method of making them.

Prepare a common shoe the way you do a regular Neverslip, drilling the hole conical. Also make the end of the calk conical. I always prepare my calks by taking two pieces of iron, placing between those irons a layer of steel. (Any old steel scraps will do.) Weld this together and forge down to from $\frac{3}{8}$ to $\frac{7}{8}$ of an inch round, according to the

size of the shoe used. After preparing and nailing on the shoe, insert the calks in the holes prepared for them, and hit them a light tap with a soft iron hammer. The action of the horse in stepping on the calks will tighten them in the shoe and at the same time sharpen the calk, for the soft iron on the outside of the calk will wear quicker than the hard steel on the inside. To remove the calks for sharpening purposes or to let



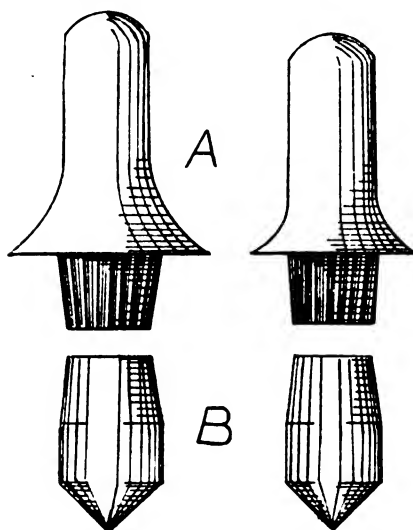
A GOOD SHOE FOR CONTRACTION.

the horse go without calks, take hold of the calk with a pair of pincers, hit the shoe close to the calk a smart rap with anything handy and the calk will come out. As mentioned before, these calks were extensively used some twenty years ago in Germany and gave entire satisfaction. The accompanying engravings show the calks and tools used in preparing shoes for stick calks. At A is shown the tools used for reaming out the holes for the calks. They should be of different sizes. The lower end is the reamer part and the upper end is the shank. The upper end of the calks B are to be inserted in the shoe. For shaping calks, use bottom and top swage, and have them only as deep as the shoe is thick.

A Good Shoe for Contracted Feet.

WM. A. ANGLE.

The shoe shown herewith is a good one to use on contracted feet and thrush; thrush, in most cases, being caused by contraction. First I fit the shoe and turn a lug down at each end of the shoe at the heel as shown in the diagram, making a center punch mark in each heel. I then take the width between center punch marks with a pair of compasses. The shoe is then nailed on the foot. The heels are then spread $\frac{1}{2}$ of an inch with a pair of tongs. Let the foot go for one week, so as to allow the nail holes to get so that they can be driven in again. The shoe is



THE MAKING AND USE OF STICK CALKS.

properly when coming into the stable and also to keep him out of drafts.

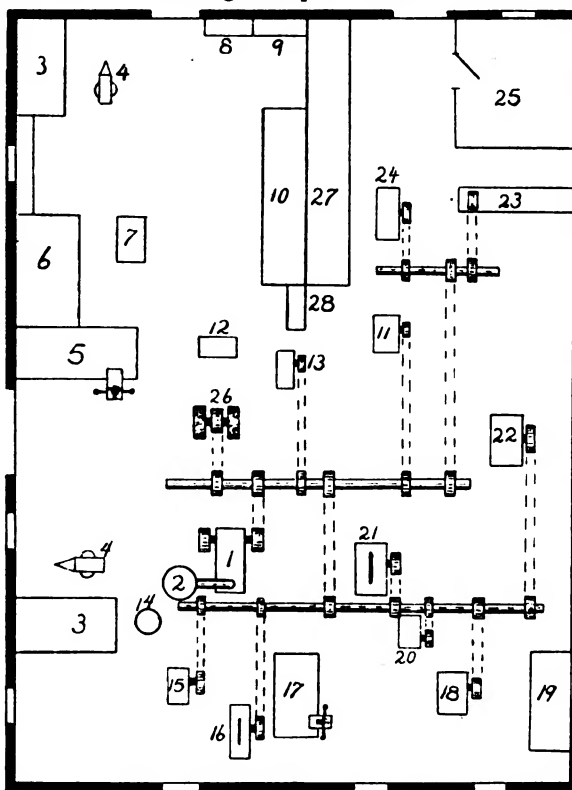
Changes in the manner of applying, or in the form of the shoes applied, should also be made gradually and not too hastily. When foods are found to incite the disease they should be with-

then taken off the foot and spread $\frac{1}{2}$ of an inch over the anvil. Place the shoe back again in the same holes, being sure to commence with the toe nails first and when all are driven the foot will be spread from toe to heel alike. If this method is followed I am sure good results will follow. I have used this shoe for years, getting excellent results from its use. When I use a wide webbed shoe, I weaken the shoe at the toe by pounding a notch out as shown in the diagram, thus allowing the shoe to expand from toe to heel alike. This information may not be new to some of the craft, but I am confident that there is a goodly number who have never tried this method.

A Well Arranged Shop of Missouri.

The accompanying engraving shows the plan of Thomas Poinsett's shop of White Water, Mo. The following numbers refer to the plan, which shows the location of the various machines:

1. Steam engine, 8 horse-power.
2. Boiler.
3. Blacksmith forges.
4. Anvils.
5. Bench.
6. Coal Box.
7. Tire shrinker.
8. Rivet case.
9. Blank nut and washer case.
10. Work bench.
11. Grind stone.
12. Iron shear.
13. Press drill.
14. Well and force pump.
15. Tire bender.
16. Wood saw.
17. Wagon maker's bench.
18. Band saw.
19. Wagon maker's bench.
20. Boring machine.
21. Rip saw table.
22. Spoke tenoning machine.
23. Wood turning lathe.
24. Pony planer.
25. Office.
26. Emery stand.
27. Spoke and fellow rack.
28. Bolt case.



PLAN OF A WELL ARRANGED MISSOURI SHOP.

This shop is said to be the best equipped and handiest arranged general blacksmith and wagon shop in the county, in which there are many. The tools are all up to date and most of them are comparatively new. All kinds of repair work is done and also new work, which is done at odd times. Mr. Poinsett usually employs from four to five men, two blacksmiths, two wagon

makers and a helper for the two smiths. Horseshoeing in all its branches is also done in this shop.

Mr. Poinsett ran his shop for eight years without power, but about three years ago he purchased a second hand steam engine and boiler (eight horse-power) which he says gives him ample power. Mr. Poinsett says, "I haven't had any experience with gasoline engines which may be cheaper and give equally as good power, but I hear my neighboring blacksmith say his gasoline engine gives him quite a bit of trouble, but this may be from lack of knowledge to operate it."

The following is a list of the prices from Missouri:

Shoeing, per set.....	\$ 1.00
Resetting old shoes, per set.....	.50
Welding buggy axles.....	.50
Welding buggy springs.....	.25
Resetting buggy tires, per set.....	2.00
Resetting wagon tires, per set.....	1.75
Pointing steel plow shares... 25 to	.75

Sharpening steel plow shares.. 10 to	.25
Welding buggy shaft irons.....each	25
Welding buggy pole irons.....each	25
New buggy shafts, complete.....	3.00
New buggy poles, complete.. 2.50 to	5.50
Putting in new buggy body, one side	2.50
Putting in new buggy body, two sides	4.50
Putting in new buggy body, one end.....	1.00
Putting in new buggy body, two ends.....	1.75

Putting in new buggy body, complete.....	\$10.00
New buggy top sockets, each.....	.50
Putting in buggy reach, single.....	.50
Putting in buggy reach, double.....	1.00
Setting buggy axle.....	.50
New buggy singletree.....	.50
New buggy doubletree.....	.75
New wagon tongue.....	1.25
New wagon tongue and hounds ironed complete.....	3.75
Wagon axles from..... 2.25 to	3.00
Wagon bolsters, front or hind	1.25
Sand board.....	1.00
Hind hounds, each.....	1.00
Front hounds, each.....	.75
Front circle hounds.....	2.25
Ironing circle hounds, new irons..	1.00
New circle irons, $\frac{1}{2}$ square, each.....	.50
New 3-inch farm wagon, complete..	58.00
New $3\frac{1}{2}$ -inch farm wagon, complete.....	60.00
New 3-inch farm truck, 3 x $\frac{1}{2}$ -inch tires.....	48.00
New $3\frac{1}{2}$ -inch farm truck, 3 x $\frac{1}{2}$ -inch tires.....	50.00

All other repair work in proportion to the above.

How to Shoe the Knee-Striking Horse.

E. W. MATTHEWS.

I find that knee striking is one of the most difficult defects to cure. My opinion is that the main cause is the position of the limbs towards the body or shoulder. I have known horses that were perfectly built have this troublesome habit, but they were rattle-headed, and losing their stride they would bang their knees. But those addicted to the trouble by nature, though rare compared to other defects, are still very troublesome.

The worst case of knee striking I ever dealt with was Maggie D., a "nigger-heeled knee-banger." It is impossible for one of this kind to break over at any other point than the inside toe. I have heard a great many shoers say that if she could be made to break over on the inside toe she would not hit, but the fact is, she does break over on the inside. She handles her feet so fast at speed, that it is impossible for the eye to decide how she breaks over. But if you looked at her foot-prints when the track is a little damp, you could see she made the heavy impression about $\frac{1}{4}$ of an inch inside of the center of the toe, showing conclusively how she broke over.

The first thing I do with either a nigger-footed or pigeon-toed horse, is to get the foot level. To illustrate my method I refer to Fig. 1, showing the

ground surface of the hoof. When a horse comes in, the first thing I do is to follow the center of the frog and get the center of the toe, which point I have marked A. Then take a tape line and measure from the center of the heel just below the hair and get the center of the coronet C. Then draw the line A, C on the hoof, and measure $1\frac{1}{2}$ inches each way from the center of the coronet C and mark as at D D. Then measure from the center of the toe A, $2\frac{1}{2}$ inches

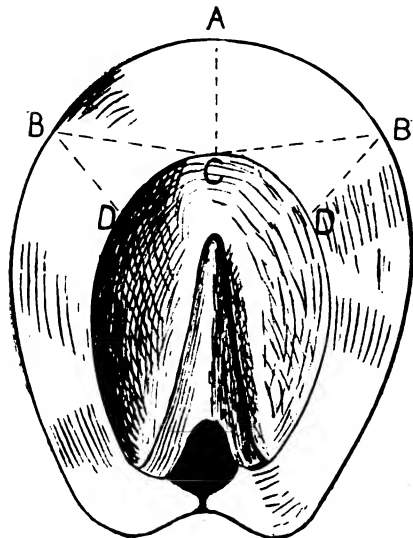


Fig. 1.—DIAGRAM SHOWING HOW TO MARK THE FOOT.

around the bottom of the hoof each way and mark as at B, B. Next draw an outside line from the coronet marks D D to the ground marks B B.

Now take a pair of calipers and measure the inside from D to B, then the outside from D to B, and if the subject is a nigger-footed horse, you will find the outside from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch deeper than the inside. Now rasp off the horn from the bottom of the foot on the outside at B, until it is the same depth as the inside of the foot from D to B, level the foot from the outside B to the inside B, then from the B on the outside to the heel. Now you have it level from the outside heel to the inside B. But from the inside B to the inside heel it is likely the leveler or shoe will not bear on the foot. Now if the foot is long enough you can cut it from the outside heel to the inside B as much as the shoe lacks of touching the inside heel, and let it gradually taper from the inside B to the inside heel and the foot is perfectly true, with the shoe bearing evenly all around. But when you get it level from the outside heel to the inside B and it is too close to bear cutting any more, you will have to place a piece of sole leather

trimmed to a feather edge at the inside B and bush from that point to the inside heel by putting the leather between the hoof and the shoe.

If you are working on a pigeon-toed horse, and you get the foot level from B to B you will have to work on the inside first and bush the outside heel. You will also find the inside from D to B from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch deeper than the outside from D to B. Now if you have the foot perfectly true and level, you will find both the outside and inside of an equal distance from D to B, but as a final test set your compass at the center of the coronet C and measure to both the outside and inside B and if both distances are equal you have a perfectly prepared foot.

Go through the same process with each foot and put the shoes on. Go easy with the horse for a few days until he gets used to them, then speed him along and if he does not go right with the plain shoes he is one of the kind that is deformed in some way and you will have to overcome the defect with shoes. Leave the foot just as you have it for the plain shoe Fig. 2, A, and try a square toed-shoe, B. If that fails, try the outside heel and the inside toe weight shoe, C. Try it first with the round toe. If that fails, try it with a square toe. If that fails, try the outside straight from the center of the toe to the first nail, as in D. If that fails on a nigger-footed horse, put back plain shoes and use spreaders. I have not given any shoes for pigeon-toed knee bangers as I never had one of that kind that leveling the feet did not stop or cure.

Handy Anvil Tongs for Bending Clips.

GEORGE NABLO.

The accompanying engraving shows a pair of useful anvil tongs which are

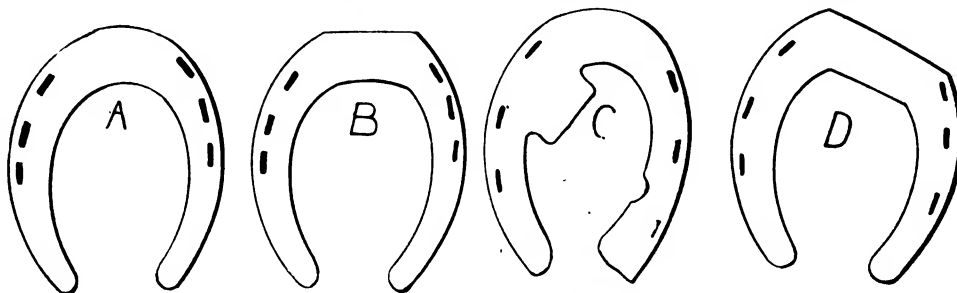


Fig. 2—VARIOUS SHOES USED ON THE KNEE STRIKING HORSE.

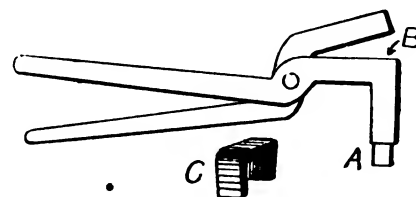
very handy for bending clips for buggy and carriage springs. The tongs are used by putting the stem A into the hardy hole on the anvil, placing the heated iron across the lower lip of the tongs at B, and hammering each end of the clip down against the sides of the

tongs. Clips of larger size can be bent by using a cap C and placing it on the lower lip B. The upper jaw of the tongs holds the iron to be bent, firmly in place while hammering each end of the clip so as to have it uniform throughout.

How the Broken Cogwheels Were Mended.

H. B. DAVIS.

Within the past year several broken cogwheels have come to the shop and as none were sent away without being



A PAIR OF HANDY ANVIL TONGS.

repaired, it may be interesting to fellow craftsmen to know exactly how the jobs were done.

When the rim of the cogwheel was thin, a cog was prepared with a shank, or if the rim was wide enough, two shanks were formed on the cog. One or two holes (according to the number of shanks) were then bored in the rim of the wheel to admit the shank of the cog. The cog was then fastened either by riveting or with nuts. If only one shank is formed on the cog the shank must be made square and fit into a square hole so as to prevent the cog from turning and breaking the cogs on the other wheel.

In cases where the rim of the wheel is thick the new cog can be dove-tailed into the rim, care being taken to make the slot in the rim wider at the bottom than at the top and also to make the new cog the exact size of the others but as much longer or deeper as the depth of the slot. If the slot is made proper-

ly and the cog fits it well the cog will be as strong as the old ones and will not work loose.

The writer is strongly in favor of repairing everything possible that comes to the shop. Many times these jobs are done at very little profit but they help

very materially in bringing trade your way. It is the best kind of advertising to have your customers recommend you to their neighbors and this they will certainly do when you show an accommodating spirit.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

Two good recipes for polishing brass are the following: Mix 3 parts oxalic acid dissolved in 40 parts hot water; add 100 parts powdered pumice stone, 2 parts oil of turpentine, 12 parts soft soap and 12 parts fat oil. The second formula: 4 oz. rotten stone, 1 oz. oxalic acid in fine powder, 1½ oz. sweet oil, enough turpentine to make a paste.

A good paint for stacks and boiler fronts is made of asphaltum cut down with turpentine to the proper consistency.

A steel worker says that raising specks and scales on steel while heating for tempering will necessitate its being worked until cool so as to close the pores of the metal, as allowing the metal to slowly cool to cherry red and then tempering will spoil it.

A California smith, speaking about cutting threads by hand, says that when he has a nut or bolt to thread he places it in the jaws of the vise at an angle of about forty-five degrees, because it allows the work to be done much easier and faster.

About the only rule that I can see regarding, shoeing to cure interfering and forging, says a New York smith, is to have the owner of the animal give you a chance to shoe the horse all the time. I am sure in doing this you will succeed in making the horse go right, if your judgment is good.

A Nebraska smith sends in the following for tempering gun springs: Harden the springs in oil, reheat evenly until they are hot enough to spark hardwood sawdust and then cool in oil.

It is a well-known fact among steel workers that light blows on heavy work effect only the surface of a piece while too heavy hammers will crush the grain of the metal. It is therefore imperative that the right weight of hammer and blow be used on the work in hand.

To keep the soldering iron bright and free from the black produced by the heating process, dip the iron into the following solution immediately after taking from the fire:—thoroughly dissolve a quarter pound of sol ammoniac in one pint of water. This will brighten the iron immediately.

Of course the old smiths know exactly how much to allow for waste in welding, but did you ever think how they gained this knowledge? By watching very closely and measuring their stock before and after welding. A pointer for the observing young smith.

The boss had occasion to temporarily increase the speed of one of the machines in the shop the other day and not having a larger pulley he went about it in this manner: He fastened one end of a manilla rope

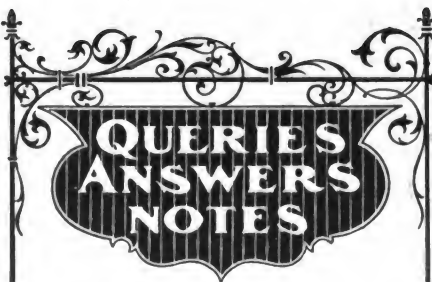
to the line shaft pulley with a hook bolt. He then wrapped the rope evenly around the pulley and fastened the other end the same as the first. This increased the speed of the machine without necessitating the buying of a new and larger pulley.

A good anti-rust paint for iron and metals is the following, due to the Western Painter: Dissolve six ounces of powdered resin in one gallon of gasoline; then add three ounces of powdered bronze, and afterwards four ounces of powdered alum. If one ounce of plumbago or "blacklead," and two ounces of lampblack are added, the paint can be polished like a stove polish.

Welding compounds containing iron filings give excellent results, especially in welding steel to steel. Here is a good formula: Take three pounds of borax and mix with it two pounds of yellow prussiate of potash. Powder finely and add water, to form a paste. Boil all the water out, keeping it over the fire till hard. Then grind up and mix in with it a pound of wrought iron filings free from rust.

Last week the bearing on the wood shaper burned out again. This being the third time within two months, the boss thought it about time something was done to remedy the trouble. So he cut all the old babbitt metal out of the box and taking some heavy copper wire, bent it crisscross until he had enough to fill the length of the box. He then laid it in the box, replaced the shaft and poured the hot babbitt metal in the usual manner. The object is to prevent the babbitt from overheating and to have the shaft bear on the wire as well as on the babbitt metal.

A horse with badly cut hind ankles was brought to the shop last Wednesday. Tanner, the assistant boss, found that the poor animal was sharp-shod, but that the heel calks were at right angles to the branches of the shoe and consequently the horse's feet struck by slipping against each other. The assistant boss therefore shod the horse with shoes having the toe and inner heel calks in the usual position, but in place of the usual outer heel calk he welded a toe calk on at this point and running lengthwise of the shoe. This prevented the feet from slipping sideways and injuring each other.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

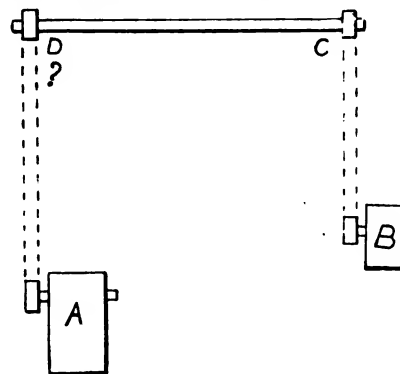
Tempering an Anvil.—Will some brother smith kindly tell me the best way to temper an anvil and also what to use in tempering?
J. W. COURTNEY.

A Broken Cylinder Jacket.—Can anyone tell me through THE AMERICAN BLACKSMITH of a flux or solder to repair a broken cylinder jacket? The jacket cracked on account of water freezing.
C. ARNOLD.

A word of thanks.—I made the triangle out of ¼-inch spring steel, according to your

diagram which appeared in the December paper, and it worked O. K. Thanks to you for answering me in regard to the job. I like your paper and get a "heap" of good things out of it.
JOHN F. SMITH.

Size of Pulley for Line Shaft.—Kindly tell me the size of the pulley I will need on my line shaft at the point indicated by the question mark in the diagram. A indicates my gas engine, the pulley of which is



SIZE OF PULLEY FOR LINE SHAFT.

32 inches and the speed 266 revolutions. B indicates the machine I wish to run at a speed of between 700 and 750 revolutions. The pulley on this machine is 14 inches. C is a 20-inch pulley, and D is the pulley the size of which I wish to know.

In Answer.—The size of the pulley indicated by the question mark will need to be 16 inches. This size will drive the 20-inch pulley C at a rate of 525 revolutions and the machine at a rate of 723 revolutions

Calendars.—I received my fifty calendars in good shape, and will say I am well pleased with them. Everybody wants one. I think they are a very nice advertisement and if you have anything like them the first of next year, I will order the same as I did before.
C. B. REECE.

The Horseshoers' License Law.—Can some one tell me if a law has been passed in the State of Ohio requiring the examination of horseshoers who wish to take out a license? If such a law has been passed, who are the examiners and when can a man take the examination?
H. J. EBERHART.

Some Pointers on Gasoline Engines.—As most craftsmen differ on the question of sufficient power to run a shop, I give the following from my experience. I have a four-horsepower Waterloo engine, which I consider a perfect running engine. My advice to blacksmiths is, not to get less than a four-horsepower engine. It would be best to have a dynamo sparker, of which there are several good makes, in connection with the engine.
G. H. MILLAR.

Plow Work.—I am a young smith and would like to have some advice on plow work. I would like to know in detail how to make a share, or lay, as some call it. I have never made one, but will have the job soon. Ninety per cent. of all shop-made shears I ever saw, rip loose from the bar. How may a shear be tempered with best results? My way is to heat the point and lay, to a low red heat (according to kind of steel used, of course some require more heat than others) so that when plunged in the tub the color will be blue black. This seems to be a little too soft, but when I try to get a higher temper it is uneven. Will some one please tell me how to overcome this trouble?
G. L. THOMAS.

Credit.—Engines.—The discussion of a lien law does not interest me much, because it is a man's money I want, and if I can't get it, I do not want his work, and so far I

have made a success of my plan. When a man asks me for credit I tell him I can wait 30 or 60 days, or possibly until I need the money, but that when I do need it, he must expect to pay. I am willing to accommodate anyone who appreciates it and is willing to return a favor. Smiths ought to be getting to a cash basis. The smith who does not want bad accounts must learn when to say "no." Some say, "if we turn them down we will lose their trade." For my part I would rather lose their trade than my time and material. But be sure to give a man value received for his money.

A few words in regard to gasoline engines, as I have had lots of observation and some experience. If you think you need a two-horse-power, buy a four, if a four-horse-power, buy a six, and so on. Many of the shops in this country have a four-horse-power engine, but when they have to buy a new one they will put in a larger one. I have an eight-horse-power International engine, built by the International Harvester Co., of Chicago. With it I run a grinder and a patent drill, an 18-inch rip saw, a big emery grinding disc sharpener, and I expect to put in a trip hammer in the spring.

B. E. ROBINSON.

Another use for the Monkey Wrench.—It often happens that there is no pipe wrench available when one is needed or perhaps two are wanted when there is only one and I have found the following kinks quite useful in this connection: Take a piece of $\frac{1}{4}$ -inch round stock and place it in the wrench, as shown in the engraving, being careful to adjust the wrench so that the round piece will not roll off the pipe but will bind firmly. The more pressure put on the wrench, the more firmly will the pipe and round piece bind, but when the pressure is reversed, the wrench will release itself from the pipe instantly.

HARRY RUSH.

How to Mend a Broken Saw Blade.—In answer to H. G. Blaisdell's query how to mend a saw blade, will say, silver solder is used in mending and the following is the process: If your saw is not broken square, make it so by filing the edges. Then file so as to lap the edges about $\frac{1}{4}$ or $\frac{3}{8}$ of an inch and to fit perfectly. Now take a strip of the silver solder and clean it well by sandpapering. Be very careful to get no grease into the joint on the saw or on the solder. Now pulverize some borax and mix to a thick paste with water, rub this well into the saw joint and on the solder with a small, clean piece of wood. Now place the solder between the saw joint, and put the saw in a clamp so as to hold the joint properly. Get two irons as long as the saw is wide and about $\frac{3}{4}$ of an inch square, and while the irons are at a good red heat place one on each side of the joint and press firmly together until cold. Then remove the irons and file the joint smooth.

ORA STRATTON.

Making and Fitting Horseshoes.—I read the article on making and fitting horseshoes, by F. J. B. in the December number, and write the following for his benefit: Having travelled through the greater part of three States, I would say that I have never yet entered a shop, no matter how small, without teaching or learning something. F. J. B. said the man had a shoe, wide at the toe. Perhaps the horse had a wide toe and the man did not put the toe on right. When a man makes toes and puts them on the shoes, he must be very careful that the shoe does not break at the toe. I do not make toes at all, but just use my steel as it comes, short bar and cut the toes off to suit the horse. For you often get a horse that will wear one shoe square and the other he will wear off on the side, and it is always better to have the latter shoe a little longer.

Again, F. J. B. said the man did wrong to take the shoe out of the fire and put it in the

sand. I think that man was doing the best he knew how, for he can take a clearer heat that way than to put the sand on the shoe while in the fire. I would like to have F. J. B. tell how he starts to sharpen heels. I think that this would be an excellent article for all of us to write upon and I would like to hear from some others before I tell my way, as I think my method is the best.

I have gotten some good things out of THE AMERICAN BLACKSMITH that have helped me very much.

H. G.

Alumino-Thermics.—Thermit as a medium in the repair of locomotive parts is a coming factor. It is yet in its infancy, but we have nevertheless demonstrated that it has some merit so far as repairing

ing crucible, tripod and fitting, amounting to \$35.00, with which we repaired and have in service two wheel centers that otherwise would have been consigned to the scrap.

The Thermit Company's instructions are to use $\frac{1}{2}$ per cent. manganese as a means of hardening and at the same time making the metal tough; this we found all right. We also went a little beyond their idea and added, at one time, $\frac{1}{2}$ -inch wire nails, to another $\frac{1}{2}$ -inch steel turnings, and we found by doing so we reduced the temperature so much that the metal did not fuse.

Thermit itself is not an explosive, as you can throw it into a fire and it will not burn. It is ignited with what is known as "Ignition Powder," which is set off with an ordinary match.

Certain rules have to be observed in all repair work. The slag should not be allowed to get mixed up in the plastic iron, and the moulder (this is a moulder's job) must use good judgment, and place the runner in such a position as to prevent this. The mould must be made so as to allow the liquid iron which runs out of the crucible to flow freely around the fracture and to rise in the rising pipe. The latter must be large enough to hold sufficient metal so that the fracture is covered.

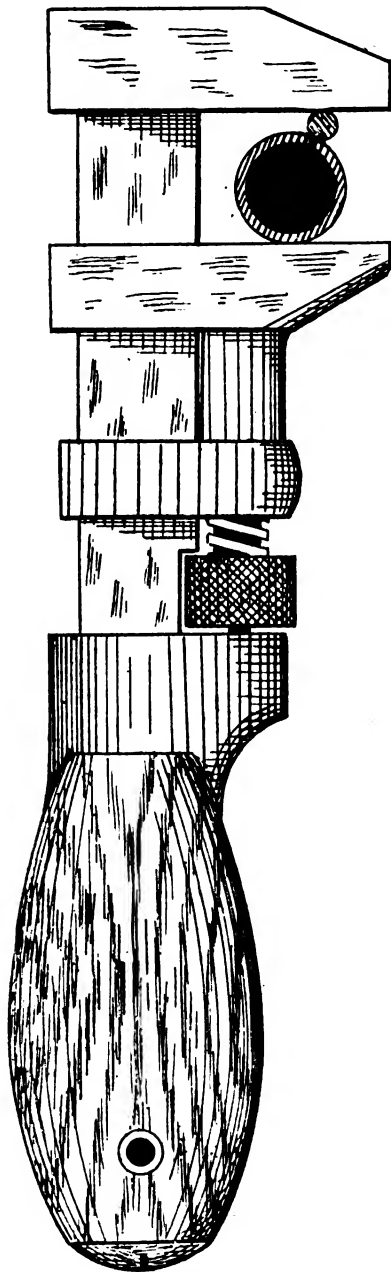
J. W. RUSSELL, N.R.M.B.A. Proceedings.

Making Wedges and Dowel Pins.—Take a piece of pine plank one inch thick, and saw off pieces one inch long. Then take your hand axe and split them into $\frac{1}{4}$ -inch pieces (with a little practice you can split them as fast as you can strike). Now take a hard piece of wood, clamp it in your vise, and saw it straight across, $\frac{1}{4}$ -inch deep. Now take your drawing knife and slope from the tip of the piece to the bottom of the sawed place. Make the slope about two inches. Now place a piece cut for a wedge into the place made and with one draw, shave the wedge to a point. Repeat on the next piece until a lot are sharp. For buggy work, split each one in two and your wedges are done. Some men make their wedges with a pocket knife or hatchet. This is too slow for me.

Another very simple thing, which I noticed very few workmen know, is to make a dowel pin. Some use a spoke auger to cut them. This is my way: Make a hole in a piece of steel about $\frac{3}{8}$ -inch smaller than the hole the pin is to fit into. Take some straight grained pieces of wood and split them in pieces a little larger than the pin wanted. Sharpen one end of each piece and drive them through the hole in the steel. The hole in the steel should be tapered slightly from the bottom of the piece.

Another thing that saved me lots of work before I bought my hub boring machine was to make a hand tool for boring out boxings. Take a piece of spring steel 18 inches long and wide enough to make a blade the size of the small part of the boxing to be set. Draw the spring to the slope of the boxing and small enough to enter the hole in the hub. Now file each edge of the spring so that when it is turned in the hub the edges will cut like a reamer. Just slope enough to make it cut. If the bevel is too great it will not cut a round hole. You can chisel out the larger end of the boxing and drive in your box. I screw the piece in the vise and put the wheel on it and then turn the wheel until the hole is the size desired. The weight of the wheel will be sufficient to make the tool cut fast, but a handle can be fastened to the tool if preferred. When a wheel comes to be filled, or with almost all the spokes broken off in the hub, knock out the boxing and punch the ends of the spoke through the hub. Then reset the box. This is the quickest way I have ever seen.

W. A. SHORT.



ANOTHER USE FOR A MONKEY WRENCH.

steel driving wheel centers. I had the pleasure of being a witness to a test given by the Goldschmidt Thermit Co., at Altoona, Pa., for the benefit of the P. R. R. blacksmith foremen. We were very much pleased and interested with the demonstration, and on our return home, so reported to the superintendent of motive power. It was decided to give the process a trial, and accordingly a supply was ordered, includ-

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Bars—Common Iron and Soft Steel.
 $\frac{1}{4}$ in., round or square; Iron, \$2.80; Steel, \$2.90
 $\frac{3}{8}$ in., " " " 2.40 " 2.50
 $\frac{1}{2}$ in., " " " 2.20 " 2.30

Flats—Bar and Band.
 $\frac{1}{8}$ x 1 in., Iron, \$2.80; Steel, \$2.90
 $\frac{1}{4}$ x 1 in., " 2.20 " 2.30
 $\frac{3}{8}$ x 1 in., " 2.40 " 2.40

Norway and Swedish Iron.
 $\frac{1}{4}$ in., round or square, \$4.90
 $\frac{3}{8}$ in., " " 4.50
 $\frac{1}{2}$ in., " " 4.80
 $\frac{3}{4}$ x 1 in., " 4.80
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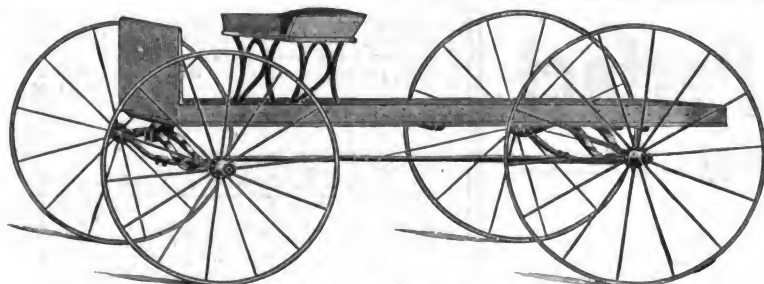
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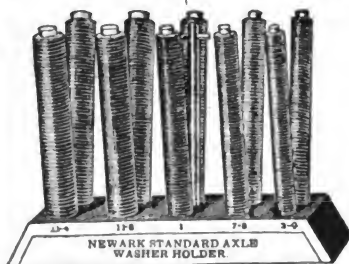
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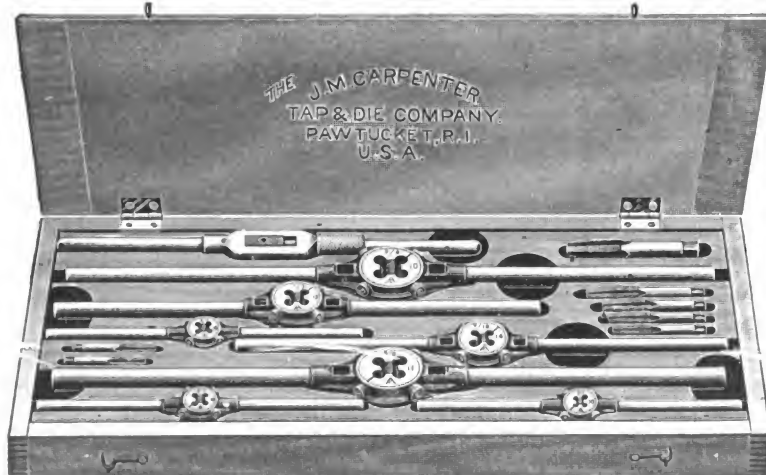
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SOME OF THE WRITERS

PROF. F. B. CROCKER, head of Dept. of Elect. Engineer'g, Columbia University: author of the sections on Storage Batteries and Management of Dynamo Electric Machinery.

PROF. WILLIAM ESTY, head of the Dept. of Electrical Engineering, Lehigh University: author of the sections on Alternating Current Machinery.

H. C. CUSHING, Jr., Wiring Expert and Consulting Engineer: author of the section on Wiring for Light and Power.

PROF. GEORGE C. SHAAD, University of Wisconsin: author of sections on Power Transmission, Electric Lighting and Power Stations.

J. R. CRAVATH, Western Editor of the Street Railway Journal: author of the section on Street Railways.

WILLIAM BOYKER, Division Engineer, N. Y. and N. J. Telephone Company.

CHAS. THOM, Chief of Quadruplex Dept. Western Union Telegraph Co.: author of the section on Telegraphy.

PROF. LOUIS DERR, Massachusetts Institute of Technology.

PERCY H. THOMAS, Chief Electrician, Cooper-Hewitt Co., New York City.

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PART II.—Theory of Dynamo-Electric Machinery—Design and Construction of Dynamos and Motors—Types of Machines—Motors in Machine Shops—Storage Batteries, including Theory, Management and Types.

PART III.—Incandescent and Arc Lighting—Electric Railways, including Car Wiring, Line Construction, Third Rail and Multiple Unit Systems—Management of Dynamo-Electric Machinery—Central Station Work, including Boilers, Engines and Electrical Machinery.

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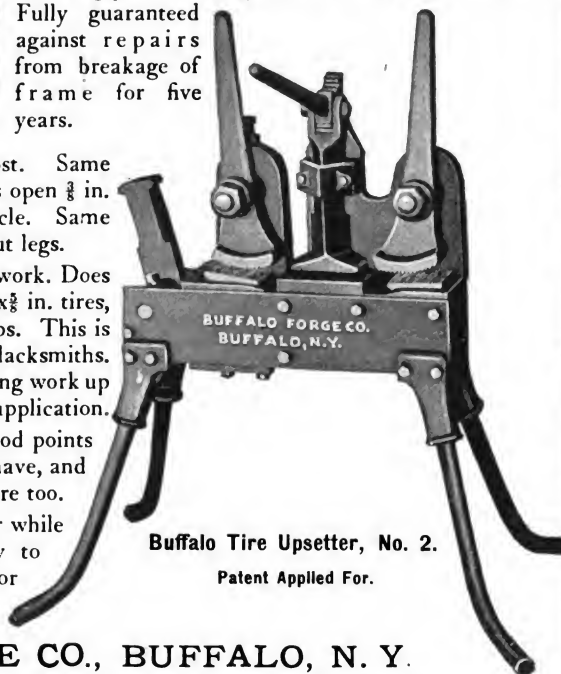
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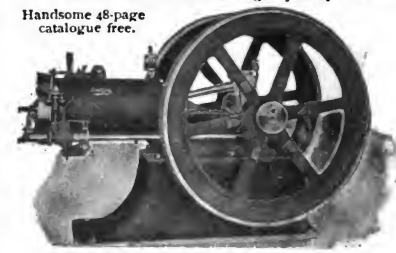
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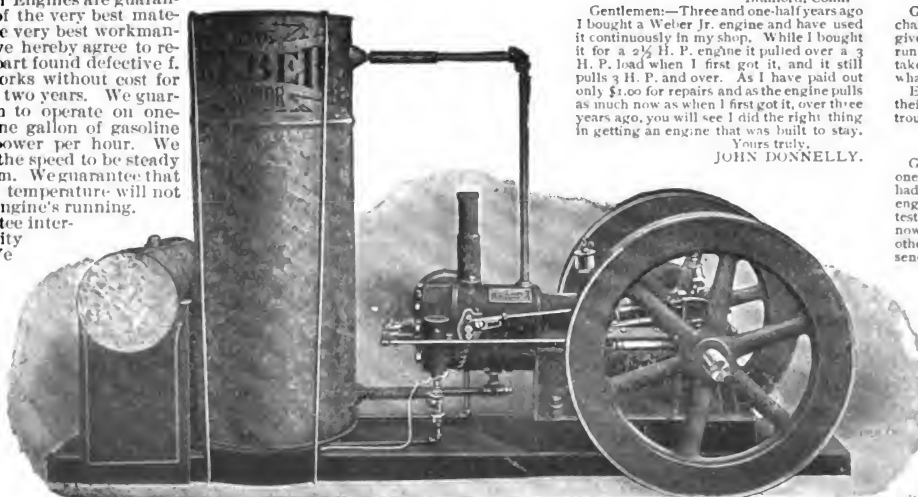
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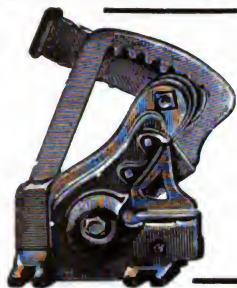
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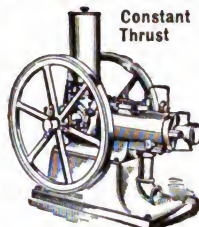
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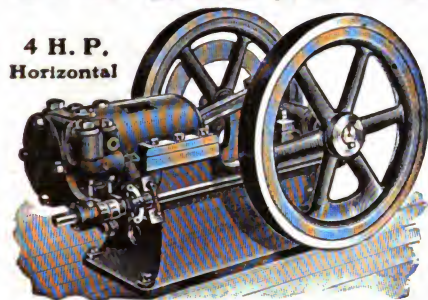
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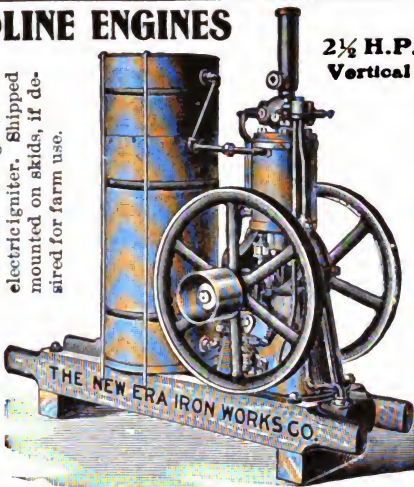
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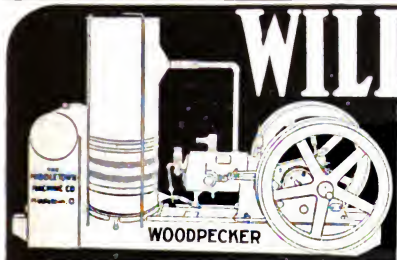
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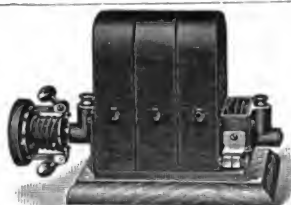
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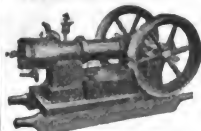
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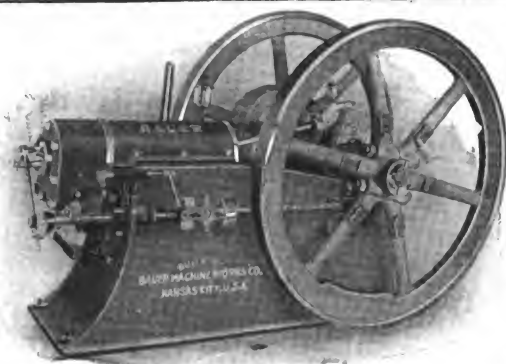
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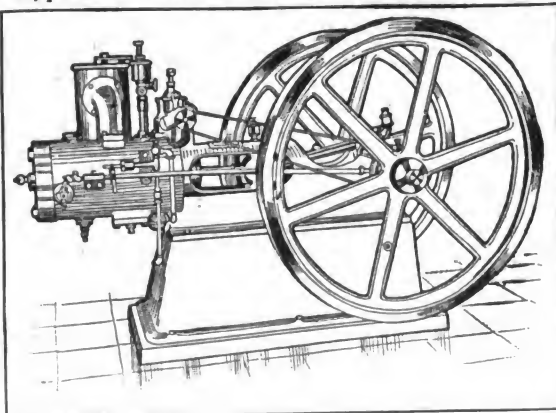
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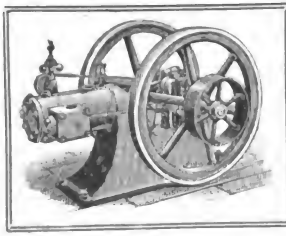
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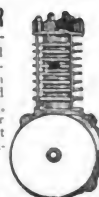
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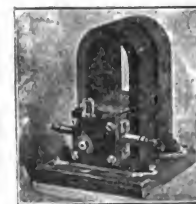


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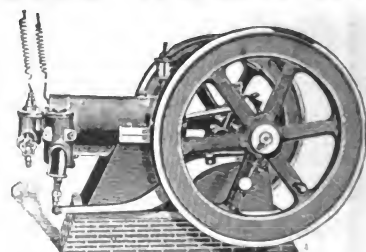


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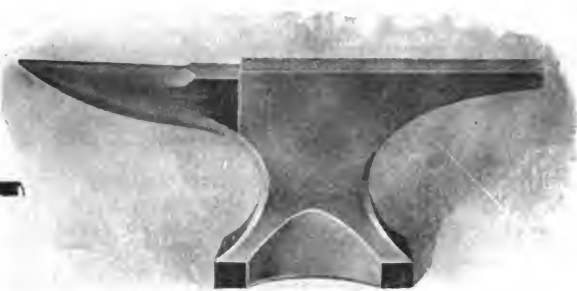
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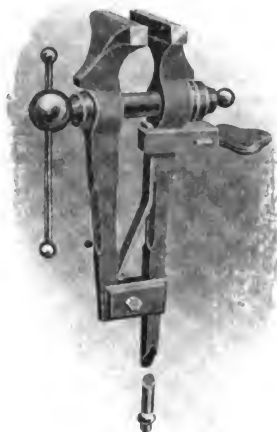
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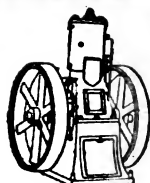
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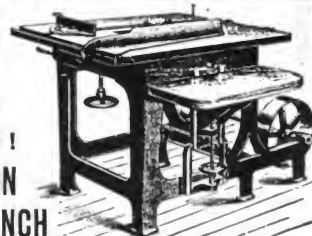
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R. E. KIDDER,

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BROWN'S

HEAVY BOWS OUR SPECIALTY

ANY SIZE
WIDTH
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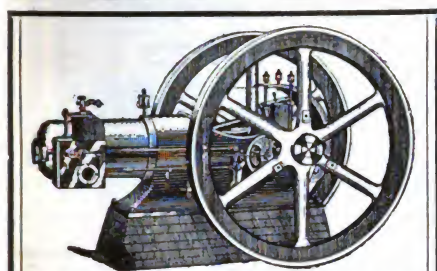
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DON'T BUY GASOLINE ENGINES

Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

until you have investigated "THE MASTER WORKMAN," a two-cylinder gasoline engine, superior to all one-cylinder engines. Cost less to buy and less to run. Quicker and easier started. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. The Temple Pump Co., Established 1853. Meagher and 15th Streets, CHICAGO.



Do Not Lose the Opportunity to secure an engine at MANUFACTURER'S COST. I have about 75 engines left of the 250. Place your order before they are all gone.

Address

E. A. MYERS, Lock Box 2003, Auburn, Ind.

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GAS AND GASOLINE ENGINES.

Vertical 2, 3, 4, 5, H. P.

Horizontal 5, 10, 12, 15, 20, 25, H. P.

Designed and Built for BUSINESS.

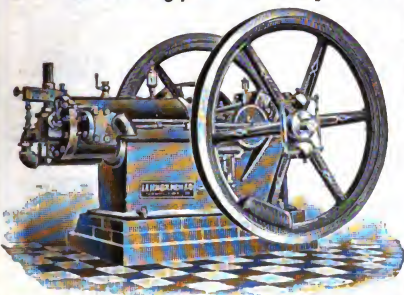
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THE LENNOX ENGINES

GAS OR GASOLINE

Have more strong points than any others



OUR electric igniter can be cleaned while the engine is running. Other makes cannot be cleaned without stopping and taking the igniter out. Send for catalogue.

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Branch House, 307 3d St., South Minneapolis.

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Erie Railroad System New York to Chicago

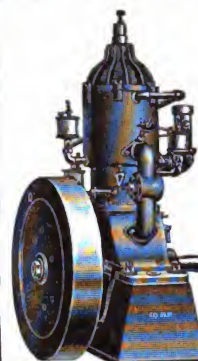
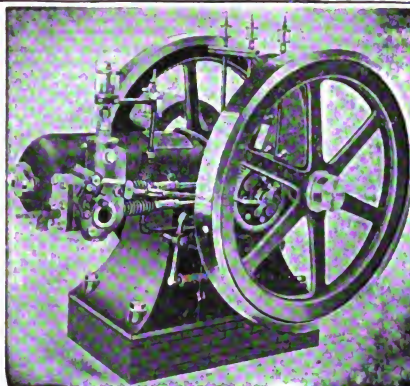
The Erie Railroad System's Industrial Department has all the territory traversed by the railroad districted in relation to resources, markets and advantages for manufacturing, and can advise with manufacturers of specific products as to suitable locations, furnishing them with current information of a comprehensive nature, dealing with the project in its full relation to manufacture and commerce.

Address

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Kerosene Oil Engines

MARINE, STATIONARY, PORTABLE
NO DANGER.

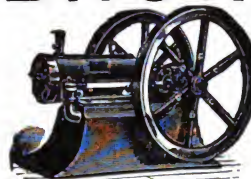
Maximum power. Lightest Weight. Simple, reliable, economical. No Batteries. Self-ignition by compression. Fully Guaranteed.

Write for Catalog.

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COMPACT
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RELIABLE.

GAS AND GASOLINE ENGINES.

Simple, Economical, Durable. You need one in your business. Write for circular and prices.

CHICAGO WATER MOTOR AND FAN CO.
22-24 S. Canal St., Chicago, Ill.

Model Gas and Gasoline Engines

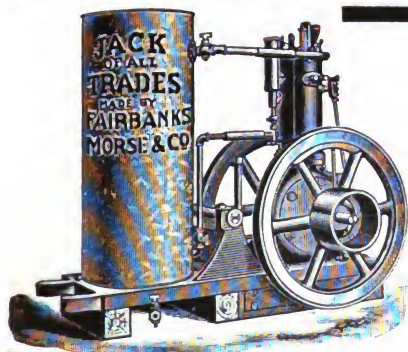
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The most economical and simplest engine on the market. No cylinder head packing to blow out, and with our automatic sensitive governor, absolute regularity of speed. Stationary, Portable, Horizontal, Vertical Hoists, Pumping and Marine. Send for Catalogue No. 11.

We build the best launch engine of 3 and 6 H. P., with Reversible Bronze Propeller Wheel and Ideal Muffler.

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STEVENS POINT, WIS.



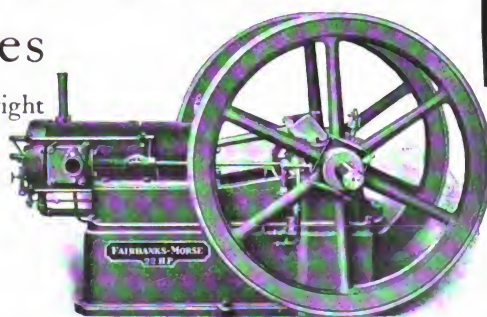
THE JACK OF ALL TRADES GASOLINE ENGINE

Develops over 2 H. P. It costs very little.

Send for Illustrated Booklet No. 80-F.

Fairbanks-Morse Gas or Gasoline Engines

Are best for the Blacksmith or Wheelwright



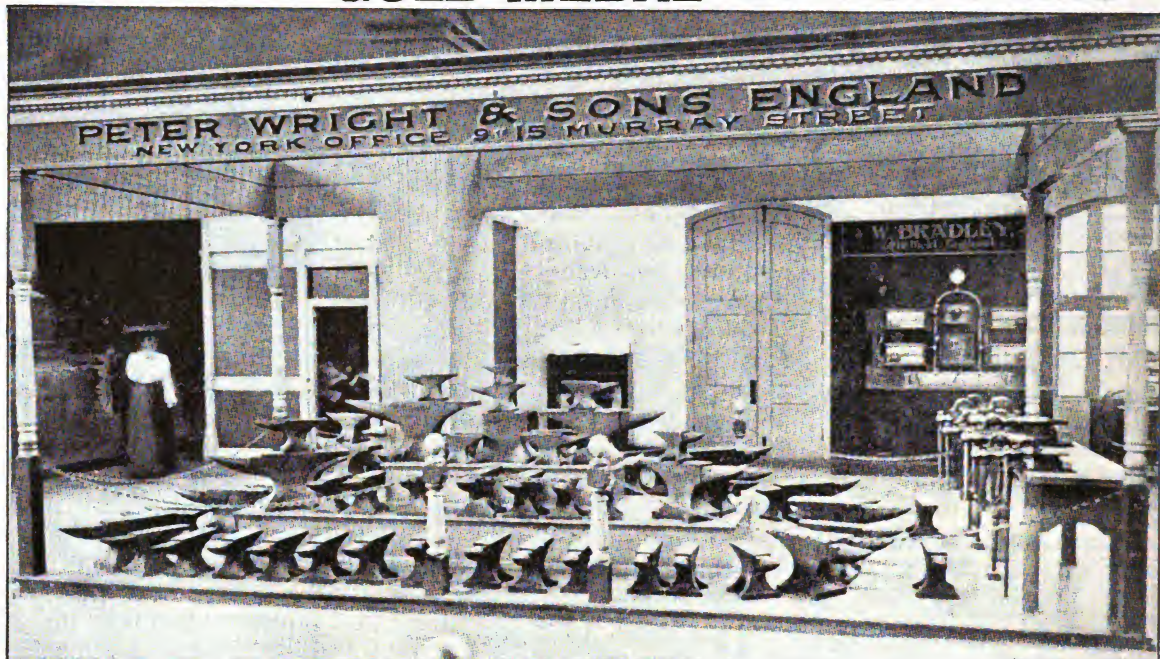
They develop more power for the money than any other. Get our catalogue and prices before purchasing elsewhere. Address nearest house.

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Detroit Denver Louisville San Francisco Kansas City Los Angeles
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PETER WRIGHT AND SONS ANVILS

RANK ABOVE ALL OTHERS. AT THE LOUISIANA PURCHASE EXPOSITION THEY WERE
AWARDED A "**GOLD MEDAL**" ON THEIR MERITS



OUR EXHIBIT AT ST. LOUIS, UPON WHICH WAS BESTOWED HIGHEST AWARDS BY THE EXPOSITION JURY
WIEBUSCH & HILGER, Ltd., 9-15 Murray Street, New York City.



We are the Original Makers of
Improved Screw Plates.



We make the Highest Quality,
the Handsomest and
Most Convenient Tools only.

Try our tools and you will be our everlasting friend.



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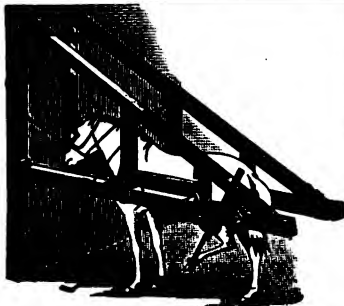
Wiley & Russell Mfg. Co., Greenfield, Mass.

TRADE
LIGHTNING
MARK



TRADE
GREEN RIVER
MARK





January 5, 1905.
GEO. BARCUS & CO., Wabash, Ind.
Dear Sirs—Please find inclosed check for balance on Stock. I have been using the Stock and it is worth its weight in gold.
Yours respectfully,
J. P. DUNBAR & CO., Newnan, Ga.

BARCUS Horse Stocks

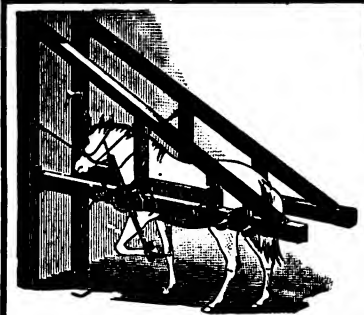
Have no block and tackle with ropes to get tangled and broken. No bracing to roof or floor. Will not skin or chafe the foot. All the objectionable features of the cheap stock have been eliminated.

They are Simple, Reliable and Durable

Not the Cheapest, but the Best.
Write for particulars.

GEO. BARCUS & COMPANY,
Box 61. WABASH, IND., U. S. A.

CANADIAN HORSE STOCK COMPANY—Hamilton, Ontario, Canada.



YOUR CHOICE

is here given you of five neat premiums in return for one new subscription to **THE AMERICAN BLACKSMITH**. Tell your brother smith how well you like the paper, send us his dollar, and get your choice of the premiums, free and sent postpaid.

WHICH ONE DO YOU WANT?

Remit by money order, stamps or registered letter. If you are not already a subscriber, send \$1.00 for a year's subscription and a premium.

American Blacksmith Co.—Box 974—Buffalo, N. Y.

1. This hoof knife is made of refined crucible steel, carefully tempered. It is a high-grade, serviceable knife, with Heller Bros. reputation back of it. Cut shows it about quarter size.



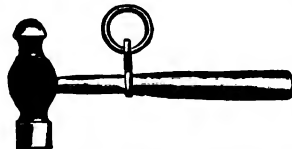
2. We offer as a premium a two line rubber stamp, with your name and address on it, accompanied with an inking pad, making a complete outfit. You will find use for it every day.



3. A handsome and reliable little pocket level like this would be of constant use to you. Nicely finished, $8\frac{1}{2}$ inches long.



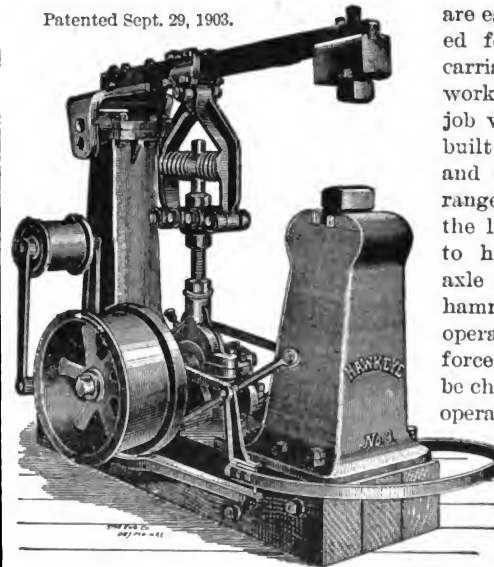
4. This Monkey-wrench in spite of being the size shown above, works just like a big wrench. The handle is of bone and the metal parts nickel-plated.



5. This miniature blacksmith hammer is neatly finished, and makes a splendid watch charm. Cut shows it full size.

THE HAWKEYE POWER HAMMERS

Patented Sept. 29, 1903.



are especially adapted for plow work, carriage and wagon work and general job work; they are built in two sizes and will handle a range of work from the lightest forging to heavy tire and axle welding. Our hammers are easy to operate and the force of blow can be changed while in operation.

For prices and description, address

Hawkeye Manufacturing, Co.
TAMA, IOWA.



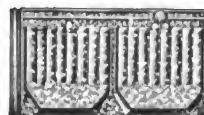
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Spavin, Ringbone, Grease Heel, Sweeney, Windgall, Enlargements, Curb, Galls, Sores, Pollevis, Scrotchies, ShoeBolls, &c. Removes unnatural growths and lameness, leaving flesh smooth and clean. Testimonials.

CHURCH BROS., AFTON, N. Y.

\$1.00 per Box, by Mail. For HORSES AND CATTLE.

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With Montross Telescope Side-Locks is the best roofing in the world for house or barn. Storm proof. Easily applied. Catalogue, Prices and Testimonials free for the asking.

Montross Metal Shingle Co., CAMDEN, N. J.

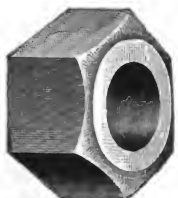


At Last! We Have It!

A Labor and Money-Saving Device.

This new Punch and Shear is the newest machine on the market. It will shear 3-16 x 3 in. flat and 1/4 in. round, and will punch a 5-16 in. hole in 2-16 in. iron. It will pay you to investigate. Write us for information.

SPRENGER MACHINE WORKS,
16 Pearl St. Near Terrace, BUFFALO, N. Y.



"MILTON" NUTS AND WASHERS

are not only accurate in size and well finished, but the price will interest you. Catalog.

MILTON MANUFACTURING CO., MILTON, PENNA.



No. 2.



DON'T BE SATISFIED

with any old kind of a **Screw Plate**. Be up-to-date and get one of the Celebrated "**Reece**" **Screw Plates**,—the kind that have the **Adjustable Guide**—the kind that make **Perfect Threads at One Cut**—the kind that are Simplest, Easiest Cutting and Most Durable. That's the kind **Reece** makes, and if you want to do your threading **Cheaper, Quicker and Better**, then get a set of **Reece's Stocks, Taps and Dies**.

Satisfaction Guaranteed.

Over **Fifty Assortments** to select from. We wish to place in the hands of every user of Taps and Dies, a copy of our 84 page Catalog. Write us at once for this Catalog if you are interested.

SPECIAL OFFER.—For 85 cts. we will send to any address in United States, a **Fine Set of Bit Brace Nut Wrenches** for $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ " Square or Hexagon Nuts. Do not fail to avail yourself of this Special Offer.

THE E. F. REECE CO., GREENFIELD, MASS., U. S. A.



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"Send for our 1905 catalogue just out. It will interest you from a pocket-book standpoint."

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1001-03 Argyle Avenue, Baltimore, Md.

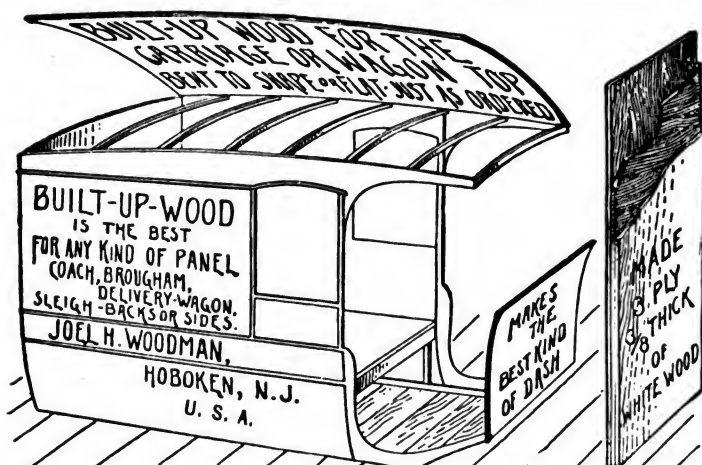


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Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, etc.

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Price list sent upon application.



No Matter What You Want to File

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there is a **SHAW-WALKER** way to do it.

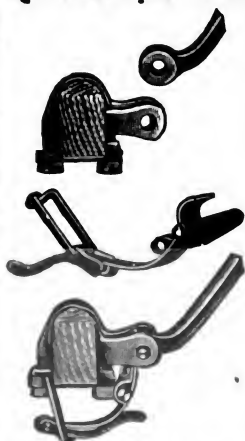
And that way we **guarantee** is best and ask nothing but return of goods if after trial you do not think so

Check in the list above those items that interest you—tear out this advertisement and mail to us. That's the first step in simplifying your office or factory detail. And do it NOW.

The Shaw-Walker Co., Muskegon, Michigan

..IMPROVED..

FERNALD QUICK SHIFT.



Patented June 13, 1899.
Dec. 22, 1903.
Canada, July 17, 1899.

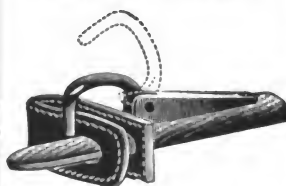
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Fernald Quick Shifters

Sold during
1904.

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The Fernald Double Trace Holder is

Something New

Sample Pair by
Mail...

25c

FERNALD MFG. CO. NORTH EAST, PA.

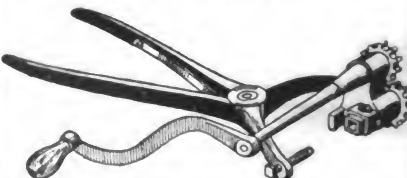
LATEST AND BEST

COMMON SENSE PUNCH AND SHEAR

5 sizes punches without a change. Will cut $\frac{1}{4}$ " x $\frac{1}{4}$ " rod iron, or $\frac{1}{4}$ " x 6" plow steel. Will punch $\frac{1}{8}$ " hole in $\frac{3}{4}$ " iron. We will sell this machine to parties in the U. S. that will furnish us references, on installments of \$5.00 or \$10.00 per month.



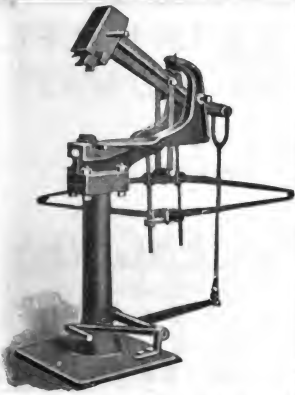
Common Sense Punch and Shear



Common Sense Tire Bolter

For particulars write

SCHUYLER CO.
626 Bryant St., San Francisco, Cal.



FOOT POWER HAMMER

A FOOT POWER HAMMER

The most convenient machine a smith could buy. Carefully constructed, easy to operate. Strong, Powerful, Durable. Requires no engine to run it.

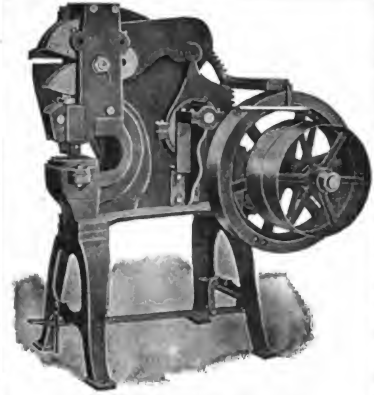
Does a Wide Range of Work. Leaves Both Hands Free.

WE ALSO MAKE A SPECIALTY OF
BLACKSMITHS' PUNCHES

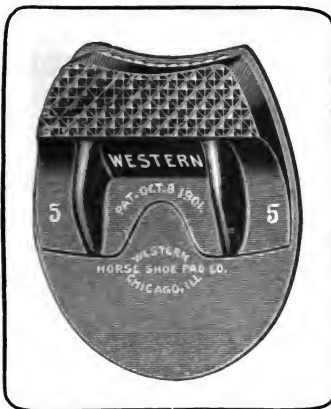
It will pay you to write for our Bulletins.

THE C. E. SUTTON COMPANY

TOLEDO, OHIO, U. S. A.



BLACKSMITH PUNCH



Do You Use Western Pads? If Not, Why Not?

Did you ever stop to consider what the name "Western" means in connection with "Pads"? If you have not, we want to say right here, Mr. Horseshoer, that "Western" stands for "Quality, Design and Freedom from Freak Ideas."

Use Western Pads and be up to date

First Rubber Company

Sole Manufacturers
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The Perfect Power Hammer



Has no equal for simplicity and efficiency. Does a wide range of work, from the lightest forging to heavy axle welding. Has a direct vertical stroke. No side motion. No breakages and no repairs necessary. Made in three sizes. Write for attractive prices.

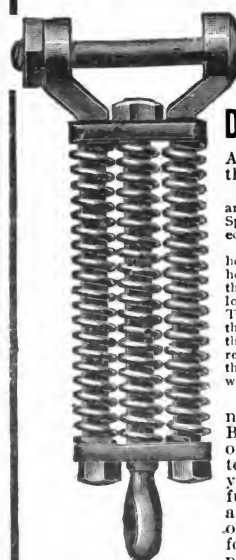
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in every city and town to sell

BEECHER

Draught Springs.

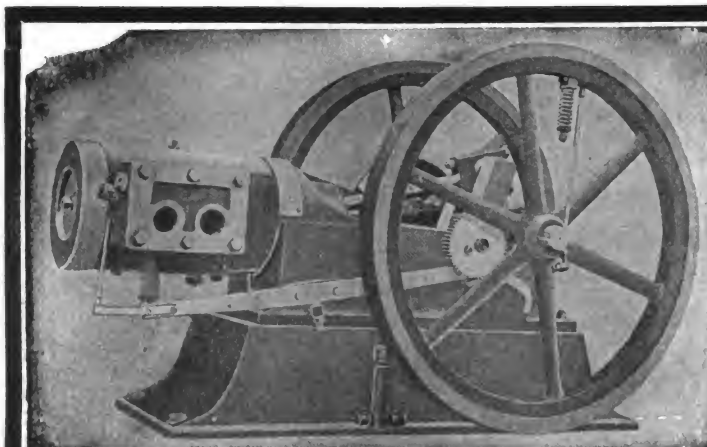
All wagon owners need them.

For simplicity, durability and usefulness, our Draught Springs simply cannot be equalled.

They act as a cushion to the horses' shoulders, they HELP horses START heavy loads, they assist in drawing the load after it is in motion. They prevent collar wounds; they save from twenty to thirty per cent. in harness repairs; prolong the life of the team and increase their working capacity.

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BEECHER DRAUGHT SPRING CO.
NEW HAVEN, CONN.



POWER IS WHAT YOU WANT

WE HAVE IT

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DAVIS GASOLINE ENGINES

Write for Catalogue and Prices

Waterloo Motor Works

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DEATH TO HEAVES
Guaranteed

Newton's Heave, Cough, Dis-
temper and Indigestion Cure.
A veterinary specific for wind,
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Strong recommendations. \$1 per
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Newton Horse Remedy Co.
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To Gas Engine Operators.
Dynamo Ignition.

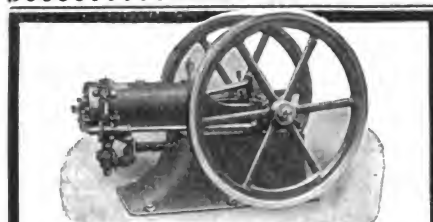
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No battery to start or
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We have an attractive proposition for the Dealer
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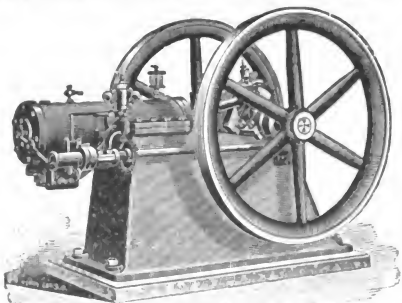
THE ADVANCE ENGINE FOR PROGRESSIVE SMITHS

No better engine made—a model of perfection, which
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ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33. Stating Horse Power
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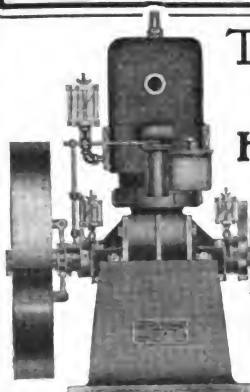
COLUMBUS MACHINE COMPANY,
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It's the
SPARK
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COUNTS



YOUR ENGINE will work better, give you less trouble and carry
a bigger load, if you ignite with one of our
Improved Mueller Spark Coils
Furnished for use with batteries or dynamo. WE GUARANTEE
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THE CUSHMAN MOTOR

widely known for its remarkable record in the
marine field, is now offered as a general purpose

HIGH GRADE STATIONARY POWER

with our fullest confidence that it will not disappoint. It gives more power
for its cost and weight with higher speed and greater steadiness with less
attention than any other gas or gasoline motor. This 1905 model
embodies all our latest improvements. The engine proper is valve-
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It is simple all through. It is the ideal power for Blacksmith and
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Handsone Catalogue in press. Write now for full particulars.

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in all leading markets.

Member Nat'l. Assn.
Engine and Boat Mfrs.

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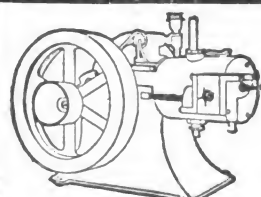
"Knowledge is Power"

Would you value the wisdom of the
gray-haired sage above the immature judg-
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20-year-old wine—rich, smooth, palatable,
to the raw harsh vintage of a year ago?
Then just as surely must you choose the
Otto Engine—the Pioneer, the 28-year-old
engine, the product of knowledge and
experience, over the crude and unreliable
output of the inexperienced builder.



OTTO GAS ENGINE WORKS, Phila, Pa.

STANDARD OF THE WORLD



BUILD Your Own Engine

$\frac{1}{4}$ H. P. Gas Engine Castings for \$15.00 with blue prints, cylinder
bored out and faced off.
Runs by gas or gasoline; water-jacketed. $\frac{1}{2}$ H. P. castings, not bored or faced, \$16.00. We
also furnish castings for large sizes. Send for catalog of engines, dynamos, electrical supplies.

L. W. GILLESPIE AND COMPANY, 220 E. Fourth Street, MARION, IND.

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Acme Hand Blower

For Blacksmiths

It has the unqualified
indorsement of
every mechanic who
has used it.



Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

Any smith can now renew the bronze bearings in the new Blower in a very few minutes.

Net price with box and connecting pipe for tuyere

\$15.50

Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
The Leader of Blowers for Blacksmiths.

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1547 Marquette Building

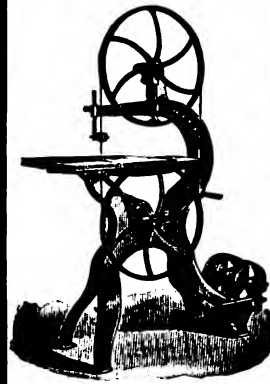
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With a Record of
SEVENTEEN YEARS

WARRANTED SATISFACTORY ON EITHER STEEL OR RUBBER TIRE.

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24-INCH BAND SAW

Built to Stand the Test of Time

A well-made, accurate machine; especially adapted to run by gasoline engine; capable of all kinds of band-sawing, particularly carriage repair work.—These are a few of the fine points of Marston's Band Saw.

We will gladly send Prices and Circulars. Drop us a card.

J. M. MARSTON & CO.
222 Ruggles St., Boston, Mass., U.S.A.

FORT RIPLEY, MINN., Jan. 23, '05.

Gentlemen :—

Twenty-four years ago I bought a Buffalo No. 3 Blower, and have used it continually ever since.

L. G. ROSE.

To BUFFALO FORGE CO.,
Buffalo, N. Y.

MIND YOU, HE IS TALKING ABOUT A BLOWER,
NOT A BELLOWS.



The
**Blacksmith's
Friends**



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

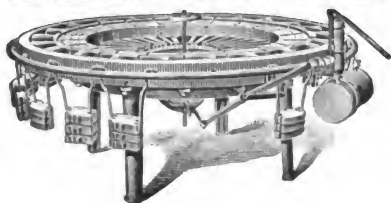
Welds at a low heat, does not fly. Saves time and fuel. **Guaranteed** to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the **Banner Brands**.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

INVESTIGATE The Hercules Hydraulic



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You
Buy a
Tire Setter

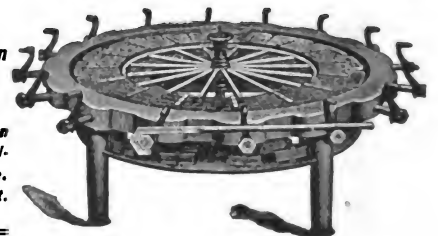
National Machine Co.
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THE

Tire Setter News

It will tell you
all about Henderson
Tire Setters.

Write for information
about our new HYDRAU-
LIC SIDE GRIP machine.
Illustration not out yet.



Standard Tire Setter Co.
KEOKUK, IA.

HAY-BUDDEN SOLID WROUGHT ANVILS

The Gold Medal Anvil
Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE
WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

VOLUME 4

THE

NUMBER 7

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

APRIL, 1905

\$1⁰⁰ A YEAR
10⁰ A COPY

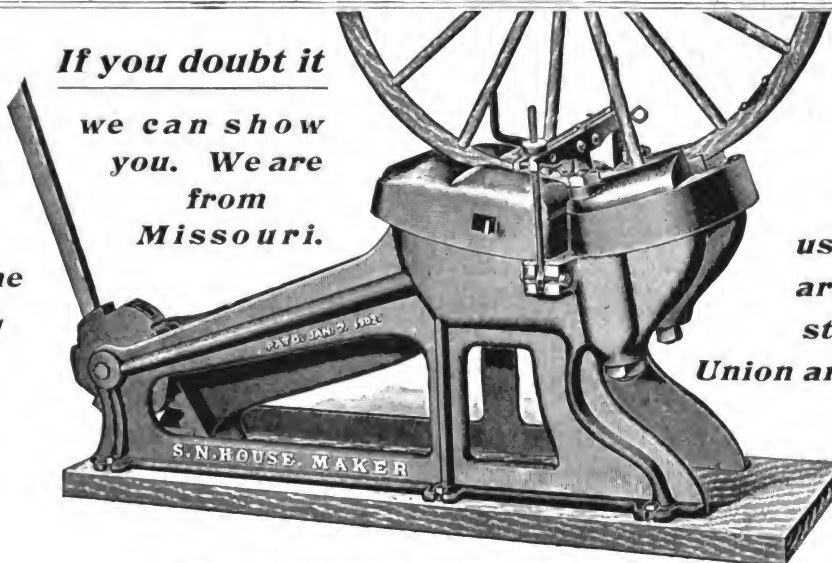
THE HOUSE COLD TIRE SETTER

HAS COME TO THE FRONT

and the thing that did it is, it does actually set a tire in 5 minutes

*And does
it better
than it
can be done
in the old
way in
one hour.*

*If you doubt it
we can show
you. We are
from
Missouri.*



*We have
1200 of
them in
successful
use, and they
are in every
state in the
Union and in seven
foreign
countries.*

*If we can't sell you
we know that you don't
run your shop for the
money there is in it.
Or that you think you
need a little more pun-
ishment as a prepara-
tion for the hereafter,
by beating off the tire,
bursting up rims, and
roasting yourself over
the fire in getting them
back on again.*



"House Cold Tire Setter in one of the best equipped shops of the South."

*Write us and we will
give you the name of
your neighbor who has
one. He will show
you all about it, for
they are all pleased
with them, or send in
your order. You need
not be afraid. They
are guaranteed and
sold cheap on easy
terms. Our guarantee
is good. Look us up.*

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Carriage Maker and Blacksmith Tools

Special
Prices to
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if this paper
is mentioned.



Fig. 900, 12 inches.

Fig. 900, "Elite," Silver Blower (patent applied for) is distinctive in design, has cut gearing and removable, interchangeable bronze bearings for gear pinions. The gearing is self contained and attached to side of fan case, has an outer bearing plate over it and is thus permanently secured so that there is no unnecessary friction or lost power. The gear covering is removable without disturbing the gearing or paddle spider. There is a light tuyere for clay lining and a heavy one to use without lining. All parts are interchangeable.

Fig. 822, Band Saws are made in sizes 20 and 26 inch for foot or belt power and 32 and 36 inch for belt power. They are properly constructed, nicely finished, adapted to factory and repair work of every kind and give unusual satisfaction.

Fig. 718, Spoke Tenon Machine cuts tenons $\frac{1}{8}$ to 2 inches diameter up to 6 inches long and also bores the felloe.

Fig. 709, Taper Hub Boxing Machine is made as illustrated, on legs and also without legs to mount on bench. It bores tapering holes in the hubs for the boxes and cuts the recesses for nuts and collars.

Made also for hand and power.

Also Forges, and a complete line of Hand and Power Drills.

Manufactured by

— THE —
SILVER MFG. CO.,

365 Broadway,

SALEM, OHIO.

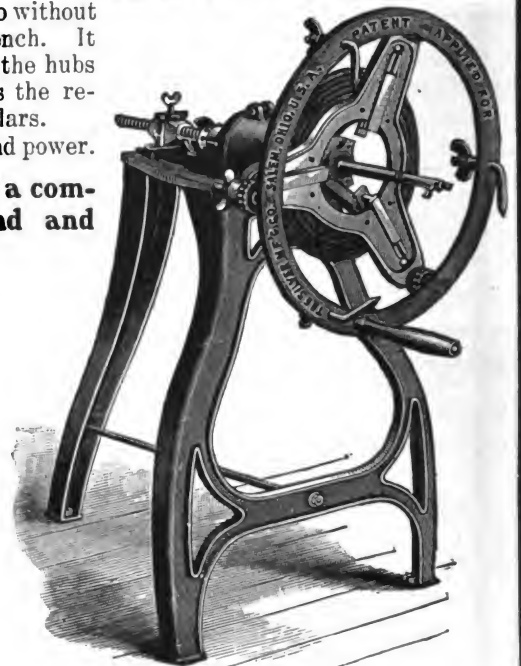


Fig. 709.

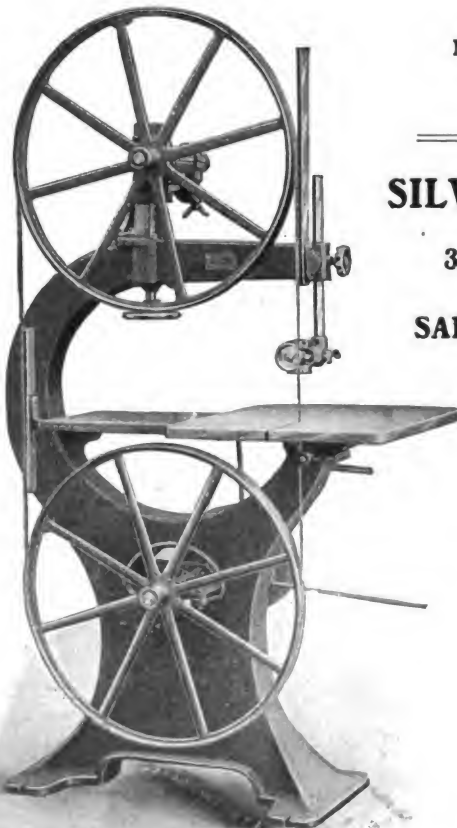


Fig. 822, 32 inch.

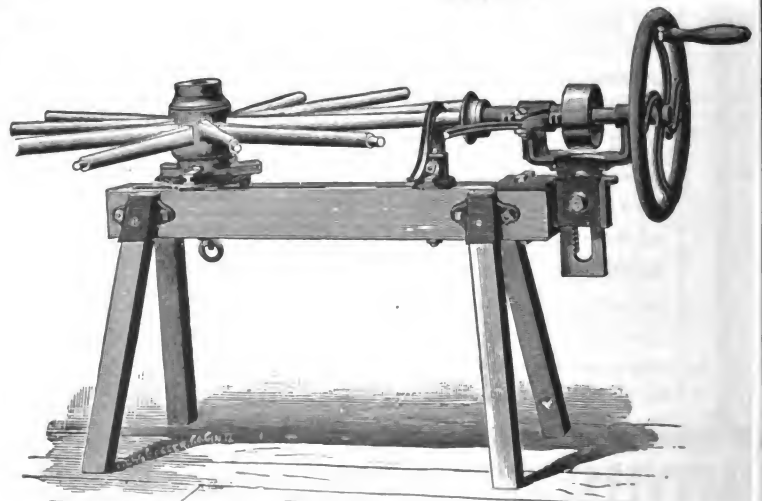


Fig. 718.



RUBBER TIRING ?

Do you do it? Is your shop up-to-date? Don't lose customers because you can't take care of your rubber tiring. Buy one of our

\$12.00 RUBBER TIRE APPLYING MACHINES.

No shop complete without it. We guarantee it to do your work and to be satisfactory in every respect. If not, money back. Fair, isn't it? You take no risk. We simply back up our statement.

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It will handle one or two wires or a flat band and is adapted to all sizes of rubber tires from $\frac{1}{4}$ " to 2" inclusive. Works equally well on new and old tires.

While it is low in price, there is no better machine on the market. This fact we guarantee. . . .

Complete instructions for operating furnished with each machine. If you desire further particulars, write us for a free booklet.

FREE WITH EACH MACHINE

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|------------------------|----------------------|
| 1 Bundle Brazing Wire | 1 Can Joint Cement |
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You'll need a Brazing Torch. Our double jet torch at \$3.95 is found on page 198 of our 1905 catalogue. Rubber Tires? We guarantee ours to be right and prices low. See pages 199-200 1905 catalogue. The rubber tiring season is now at hand **ORDER TODAY.** Have you received our **NEW SPRING CATALOGUE**? It's just out. **BEST EVER!** If you haven't a copy, **WRITE TODAY.** It's free to the trade. You can't afford to be without it.

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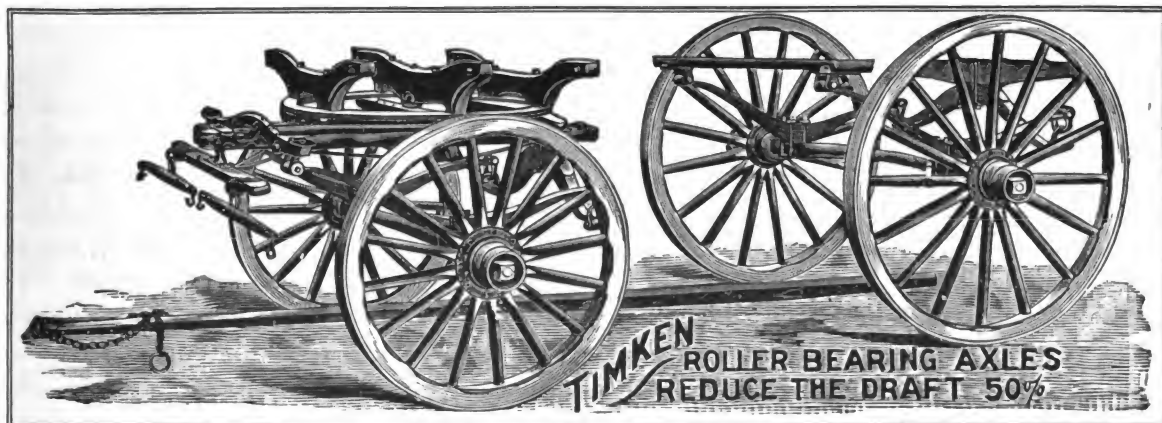
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HARTFORD, CONN.

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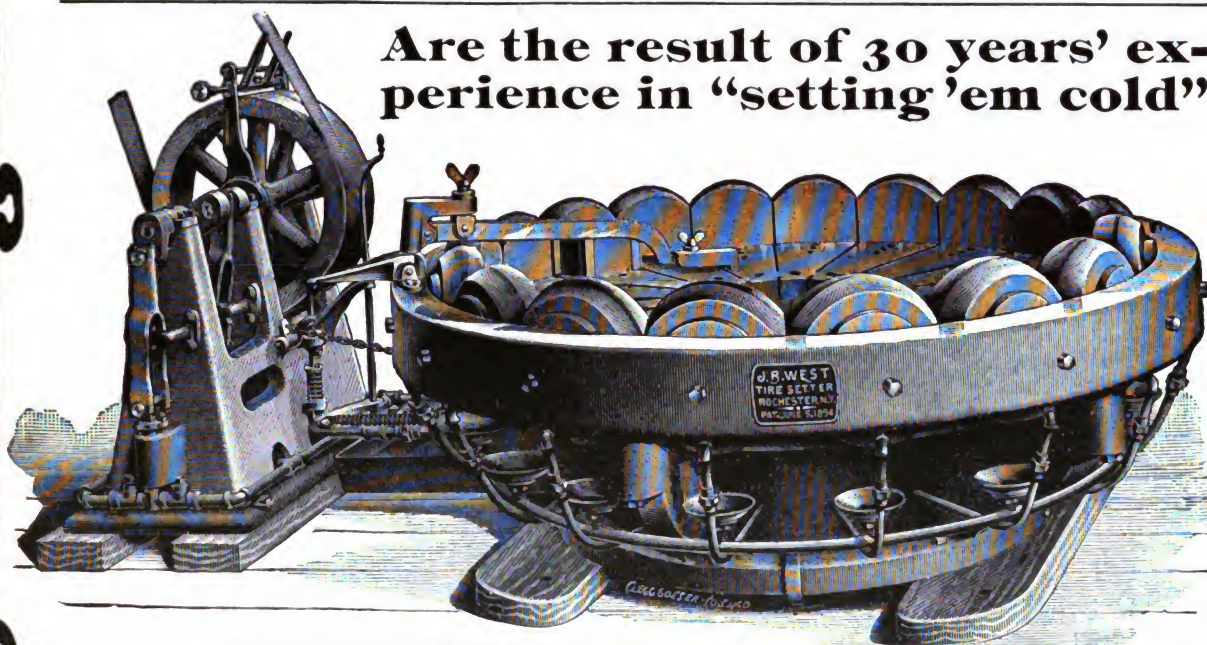
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Are the result of 30 years' experience in "setting 'em cold"



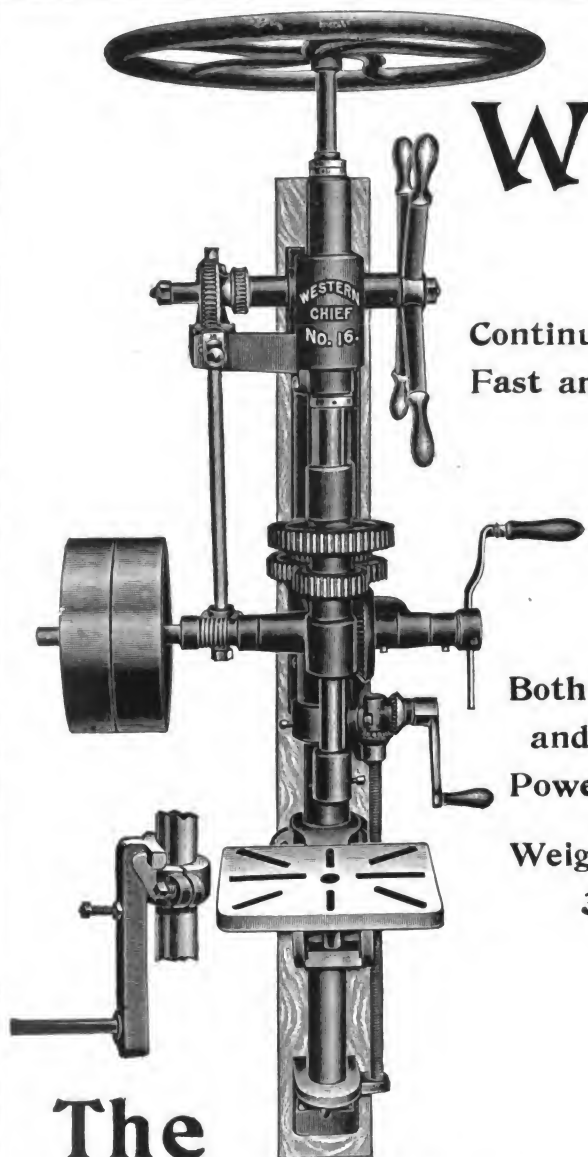
They do the work right, they are built right and they stay right. We can refer you to Customers who have used our machines for more than ten years, and they are doing their work to-day as well as when first installed. No other maker of Tire Setting Machines can give a similar reference.

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HAND MACHINES for those who have no power. Write us fully regarding YOUR requirements, and we can furnish the proper machine for your needs.

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Rochester, N. Y.

No. 16 Western Chief DRILL



Continuous Screw Feed.

Fast and Slow Speed.

Raise and Lower to Table.

Drills to center of 24-inch circle.

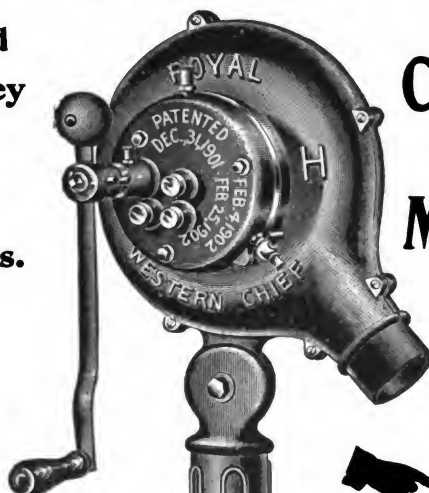
Bores 0 to 1½ in.

Spindle runs up and down 8½ inches.

Table runs up and down 16½ inches.

Both Hand
and Pulley
Power.

Weighs
360 lbs.



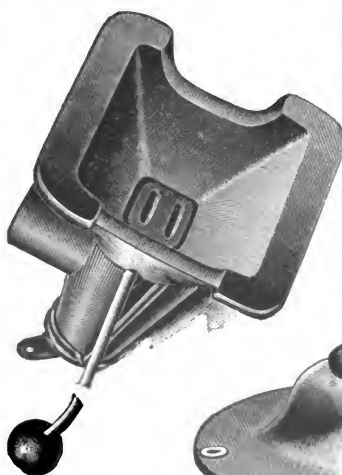
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The Royal Blower

is absolutely free from all spiral or worm gears, and has not a ball bearing in it. Spiral and worm gears are short lived, and ball bearings are not suited to such high speeds. Phosphor bronze is used for the lead gear and bearings; and steel for the pinions and shafts. It is the simplest, lightest running and surest worker of any Blower on this day's market.

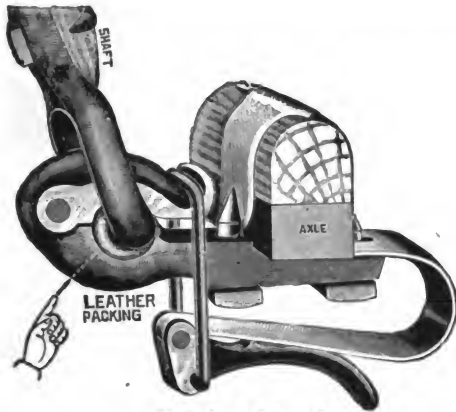
FAN, 12 inches diameter.
FIRE POT, 9x11½ x 4, inside.



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Forges, Blowers
and Drills are
sold by every
First-class Dealer
in the World.

**Ask For
Them.**





Coupling Closed

The Bradley Shaft Coupling

NEVER SQUEAKS or SIDE RATTLES

It cannot—for three reasons:

The leather packing is perfectly lubricated before it is put in the coupler.

The ball and socket construction holds equally secure in all directions.

The constant and uniform pressure of the spring automatically takes up the wear.

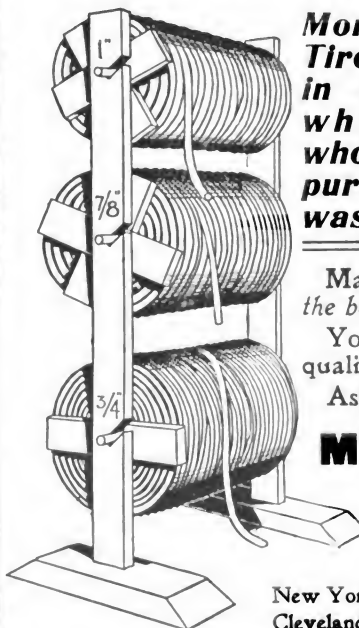
These features are the most important in a Shaft Coupling because of the object attained—ABSOLUTE NOISELESSNESS—not for A time, but for ALL time. **DON'T FORGET THE HOLDFAST COUPLER.**

C. C. Bradley & Son
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It's a Difficult Task

For a dealer or repairman to hug his scrap-end barrel and hold a full profit purse at the same time.



Morgan & Wright
Tires in long are in demand everywhere by those who prefer the full purse to the full waste barrel.

Made in one grade only—the best.

You can be sure of the quality.

Ask for our proposition.

MORGAN & WRIGHT,

CHICAGO.

New York, Dayton, Atlanta,
Cleveland, St. Louis, San Francisco.

\$20.00 A DAY and more, is often made by the leading **HORSE SHOERS** throughout the country, with

THE 1902 CHICAGO CLIPPER

which costs but

\$10.75

and is properly a part of your outfit and doubles your income.

What ruins a horse is taking cold while resting in his thick, nasty, sweaty coat. *After that* he wheezes or limps or gets stiff, and isn't worth half as much either to use or to sell.

Clip him and he's quickly rubbed dry, or dries out in 20 minutes.

He works better, lives longer, is worth more. Up-to-date farmers are finding this out more and more.

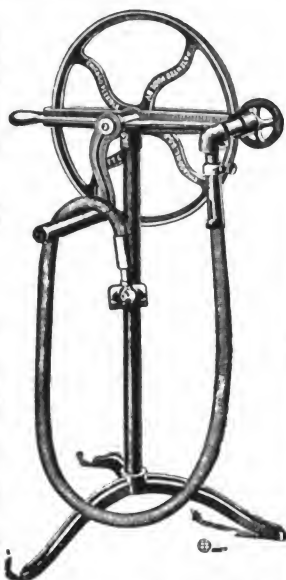
The 1902 Chicago Clipper takes more first prizes and suits more people than all other makes combined.

All Gears cut from solid metal—turns with either hand. Clips a horse in 30 minutes.

Send \$3.00 and machine will be sent C. O. D. for the balance.

Chicago Flexible Shaft Co.,

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MODERN POWER HAMMER

FOR

BLACKSMITHS AND IRON WORKERS

Used Daily Cures That "TIRED FEELING."

Height, 5 Feet.

Floor Space, 30x40 inches.

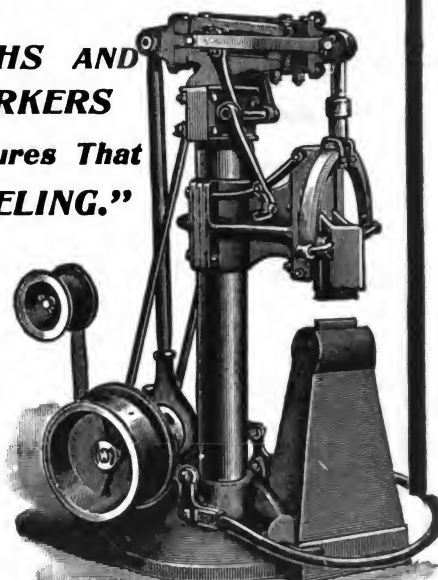
Weight, 1200 Lbs.

Length of stroke changed instantly while running. The only hammer made that will strike a very light blow at full speed. All others slow down to get a light blow.

The "Modern" gives you any blow you want at any speed; hand lever controls the force of blow, foot treadle controls the speed.

Long planed guides adjustable for wear. Cast steel hammer adjustable up and down to suit thickness of stock. Tool steel dies.

Greater range of work than any other hammer.

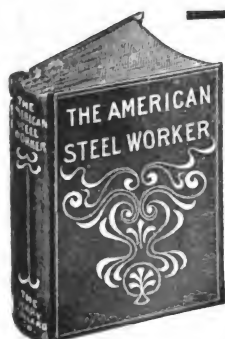


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"BEST BOOK I EVER SAW"

Writes a blacksmith. Lots of others say so, too. Markham has been hardening steel for 27 years and studying it all the

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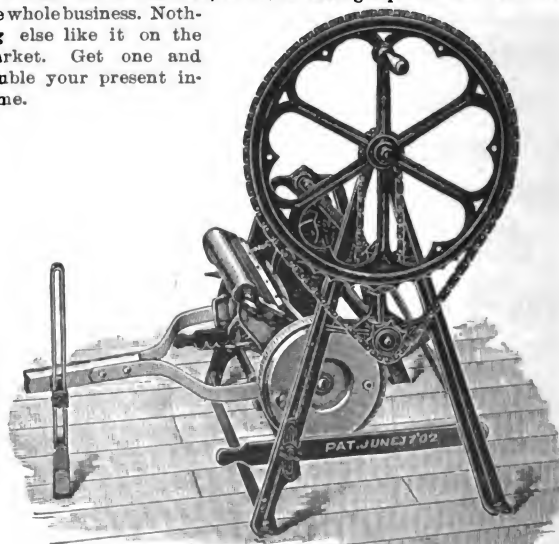
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Money back if not satisfied, or sent on approval.

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The "Ideal" Lawn Mower Grinder

Will enable you to grind any lawn mower with absolute accuracy in less than fifteen minutes, without taking apart. Revolutionizes the whole business. Nothing else like it on the market. Get one and double your present income.



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*With ball bearings
where they count.*

What use are ball bearings if they are *not* in the RIGHT PLACE?

We put them where the friction and wear come—between the drill spindle and the feed screw. No brass nuts to wear loose. They're under the fly-wheel, too. Made from tool steel, glass hardened, ground and polished. Back gears thrown in without the use of tools. Automatic hand and lever feed. For hand or power use.

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"ALASKA WELDING COAL"

Alaska Welding Coal is put through a chemical process, which gives it the greatest welding qualities of any coal ever put on the market, and once you use it you will never be without it. It is the cheapest and best coal ever used by a blacksmith. One sack of Alaska Welding Coal, mixed with any poor quality of Blacksmith's coal, will do more and better work than any compound known to the trade. You can weld all kinds of high steel, with perfect ease. It welds iron or steel to malleable castings. It will weld pieces of malleable castings as firmly as if they were never broken. You can weld spring steel as easily as two pieces of iron. It toughens poor, brittle iron; your fire never gets dirty, and is fit for welding at any time. We particularly recommend the use of Alaska Welding for heavy welding, in fact all work in a blacksmith's shop down to the shoeing of horses. It does away with the using of all welding compounds, and is the most economical fuel on the market. Buy coal of a cheaper grade and mix with the Alaska Welding Coal. It will go farther and do more work than any other coal now in use. Why pay six and a half to seven and a half (\$6.50-\$7.50) dollars for coal when Alaska Welding Coal does more and costs less. Save time and labor and money by using it. It makes the purest and cleanest fire, requiring little attention. Two handfuls sprinkled over your fire will be sufficient to do the most difficult welding job that comes into your shop.

You can weld the finest of spring steel without the use of any welding preparation whatever.

We feel justified in saying that Alaska Welding Coal is the wonder of the age. It is wonderful the different kinds of metal this coal will unite.

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"Alaska Welding Coal" is the wonder of the age, and a boon to all Blacksmiths. In this age of ours, money saved is money earned. Send us one (\$1.00) Dollar for a sample sack of fifty pounds. Manufactured by W. F. BENNETT and P. REILLEY.

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BENNETT & REILLEY.

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American Blacksmith, April.

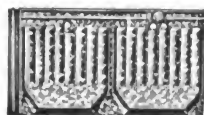
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BRAZING CAST IRON



Any blacksmith can successfully braze all broken castings in a few minutes, saving the expense of a new casting and the expensive delay of waiting for it.

THOUSANDS OF DOLLARS

are lost daily because of broken castings. The expense of replacing these castings is immense. Much money is lost because of machines lying idle waiting for broken parts to be replaced. You can prevent these large losses by

Mending Castings and make a big profit for yourself. For instance, suppose a gear wheel breaks. It may cost fifteen or twenty dollars for a new one, and the mill would have to lie idle for perhaps a week before the new one arrived. By means of a few cents' worth of **Brazit**, however, you can repair the wheel stronger than new and make as much **Brazit Will Do It.** It will successfully braze cast iron, braze cast money in an hour as you often make in days. **Brazit Will Do It.** iron to wrought iron, or weld steel to cast iron.

With Brazit you can successfully mend broken parts of machinery, agricultural implements, tools of all description, gears, windmills, pumps, engines, automobile parts, sewing machines, lawn mowers, pulleys, stoves, printing presses, and anything made of cast iron.

Our compound opens up a profitable line of work for every blacksmith. You invest practically nothing and the profits are big. You do not require special equipment, as the work is done in your forge. Wide-awake blacksmiths all over the country are taking up this work.

We want every blacksmith and repairman to try **Brazit**, because once they find out how easy it is to work, and what snug profits it makes, they will always keep a supply on hand.

In order to get you started with this profitable line of work we make the following liberal offer:—

We will send pre-paid a complete sample working set for

\$1.00

This set is sufficient to braze a large number of pieces. The directions are simple and complete.

REGULAR WORKING SETS--A complete outfit with plain directions, \$5.00

A trial of **Brazit** is the best way we know of for proving to you it will do as claimed. We want you to try it. You can do a big and profitable business mending all the broken castings in your neighborhood.

U. S. BRAZING COMPOUND COMPANY

113-115 SO. SECOND ST.

INCORPORATED.

NEW BEDFORD, MASS.

Read These Testimonials

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We acknowledge the receipt of your favor of March 4th, together with sample of "Brazit" which we have tried and found satisfactory.

POPE MANUFACTURING CO.

This is to certify that I have had a number of pieces of cast iron machinery mended with "Brazit" which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.

WILLARD N. LANE.

SHARON, S. C., Jan. 10, 1905.

I received the trial set of "Brazit" and can say it beats anything I ever saw. It does just as claimed. I broke a piece of cast iron and put it together and it was stronger than before, so you can use my name if you choose. I will order a complete outfit before very long.

C. P. LOWRENCE.

SOUTH DARTMOUTH, Mass.

I have used your compound and it worked O. K. Wish I had had some of it before.

MR. THEODORE BRIGHTMAN.

R. D. ANDERSON,

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Can furnish on short notice any sort of Fence, Lath or Scroll Work, Ornamental Posts or special orders for Wood Work. Work solicited in this or adjoining Parishes.

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Post Office Box 97.

Wisc., La. June 29, 1905

Mr. Charles Smith
Buffalo, N. Y.
Gentlemen—

My Calendar is packed
we all, La. and I am
thoroughly aware, pleased
with them. They were a
source of considerable
surprise to my customers
to see a Calendar issued
by a blacksmith. Hope
Tom Sardy saw his copy
clear to get a few also
after his good wife collected

his bill from the delinquent
customers while our way
off hunting — I am very
well pleased with my paper
and could not possibly
do without it now — got
a new "kick" out of
it every month and it
has proved as good as
a course through a
technical school to me —
I wish it every success
and a long chain
of good for success
I remain
Truly yours

R. D. Anderson

NO MATTER HOW BADLY THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.



Columbus Anvil and Forging Co.

West Frankfort St.,
Columbus, Ohio.

WE ARE
EXPERTS AT
REPAIRING OLD
WROUGHT
ANVILS.

WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

ASK YOUR DEALER FOR THEM.

HONEST DEALINGS

Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interest will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.



Lathes and Drill Presses

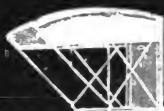
Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

Catalogue M.

SHEPARD LATHE CO., 132 W. 2d St., Cincinnati, O.

A COMPLETE LINE OF Carriage Tops and Trimmings

Seventeen different grades of tops. All good ones. Prices right.



Ask for No. 5 Catalogue

C. A. HALLIDAY, 24 Cedar St., Oneida, N.Y.

EUREKA SEPARATOR

Placed in Feed Pipe of Your Engine
TAKES the WATER out of GASOLINE.
SAVES HALF YOUR TROUBLES.
SIMPLE, CHEAP, EFFECTIVE.

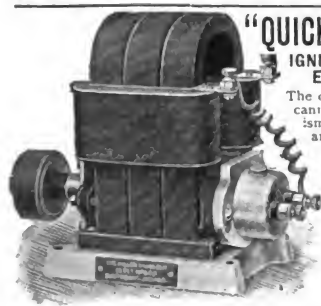
EUREKA SEPARATOR CO.,
ROCKFORD, ILL.

EATON Letter Company

73 W. Eagle St., Buffalo, N. Y.

Ever Send Out circular letters to the TRADE? Our imitation typewritten letters absolutely cannot be distinguished from the real. They are the kind that get attention, that bring results. Send for free samples.

ONLY HIGH-GRADE WORK DONE.



"QUICK ACTION"

IGNITING DYNAMOS
Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.



THE KITTERMAN INVENTION CO.

81 W. Washington St.
CHICAGO, ILL.

Manufactures all kinds of Rubber Pads and Taped Shoes and Screw Calks at prices to defy competition. Get our big Circular and know the rest.

A Good Gear!



DESIGN GOOD.
MATERIAL GOOD.
WORKMANSHIP GOOD.
WE ONLY MAKE THE BEST.

O. M. Milk Wagon
Gear No. 251.

Our exhibits at Milwaukee and New York are right up to the minute. We lead always. Our new catalogue shows sixty different styles of gears as well as our line of Surreys, Buggies, Road and Pleasure Wagons in the white; also all kinds of Bodies, Stick Seats, Tops, Trimmings. **IT'S FREE. Send for it.** With our new buildings and increased capacity we will fill all orders promptly.

SCHUBERT BROS. GEAR CO., ONEIDA, N. Y.



Hinged Butt-Ring
The only loose piece.

BALL-BEARING AXLE

Sold strictly on its merits, fully guaranteed, and at the cost of a common axle.

Write us at once and you will be surprised.

See that Extension Screw.

The only axle to use on
R. F. D. Mail Wagons.



Standard Ball Axle Works Lancaster, Pa.

TOOLS

FOR THE
HORSESHOER
AND
BLACKSMITH
IS OUR SPECIALTY



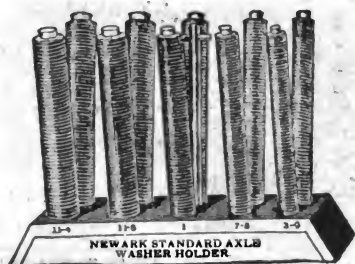
New Rounding Hammer.

FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

Champion Tool Co.

Meadville, Pa.

SOLID LEATHER AXLE WASHERS



A novelty in our Patent Axle Washer Holder. Holds 500 Newark Standard Axle Washers.

Washers are our specialty. We make washers for every axle on the market. Also a full line of

Pump Leathers and Leather Horseshoe Soles.

Write now for Prices, Illustrated descriptive circular and

FREE SAMPLE of Our Washers

and mention this publication.

If your dealer cannot supply you we will send you one of our racks along with 500 Standard Axle Washers, Express prepaid, on receipt of \$3.00

The Newark Leather Washer Mfg. Co., Newark, N. J.

BROWN'S

HEAVY BOWS OUR SPECIALTY

ANY SIZE WIDTH HEIGHT

SEND FOR CATALOGUE GIVING DESCRIPTION OF OUR FULL LINE

S. N. BROWN & CO., DAYTON, OHIO.

SHORT PRICE TAPS

Machine Screw 12 (no 2 alike) 75c

Pipe Taps
 1, 18c.; 2, 25c.; 3, 33c.
 4, 38c.; 5, 50c.; 6, 65c.
 Pipe Reamers same price.

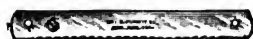


Full line of 1/2" oversize Taper Taps to fit all Standard Screw Plates.

1, 16c.; 2, 20c.; 3, 22c.; 4, 24c.; 5, 28c.; 6, 32c.; 7, 36c.; 8, 48c.; 9, 64c.; 1, 75c.

In ordering state thread wanted and make of plate
 Will still fill orders for anything offered in Jan., Feb., or March American Blacksmith.

Best Hack Saws



8 inch, 45c. dozen; 10 inch, 60c.

Will prepay postage on any above goods for 10 per cent. extra. Do you want complete Tap List?

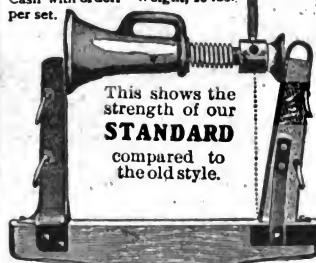
WESTERN TOOL CO., Lansing, Mich.

IMPORTANT NOTICE.

If the Blacksmiths who are intending to purchase a **Trip Hammer** will communicate with us, we will gladly mail them an Illustrated Circular giving a description of our "**Little Sampson Hammer**", and we will quote them a price that will insure us their order.

Coleman Iron Works Co., Elmira, N.Y., U.S.A.

We make the following sizes:
 No. 1, 3 In. wide, 14 in. high
 " 2, 3 1/2 " 14 "
 " 3, 3 3/4 " 10 "
Price, \$1.50 per set of 4 stks
 Cash with order. Weight, 16 lbs. per set.



This shows the strength of our **STANDARD** compared to the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time straightening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1/2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.

Blacksmiths' Tong's

Are drop-forged, without weld, from one solid piece of superior steel. They are smooth and uniform, with handles tapering to the right proportions.

Will hold round, flat, square or oval stock. Far superior to any hand-made tongs, and can be furnished for half the cost.



V Tongs for Holding Round and Square Iron.

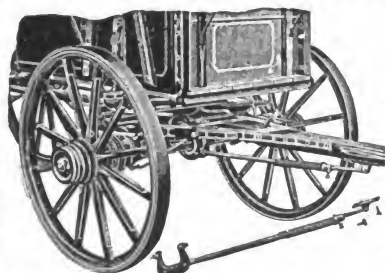
Machine Tool Tongs, Big Tongs, Little Tongs, All Kinds of Tongs. Superior quality; 100,000 pairs in use.

Write for Catalogue and Price List to

Allen-Randall Co.

310 MAIN STREET,

SPRINGFIELD, MASS.



TRIED AND TRUE

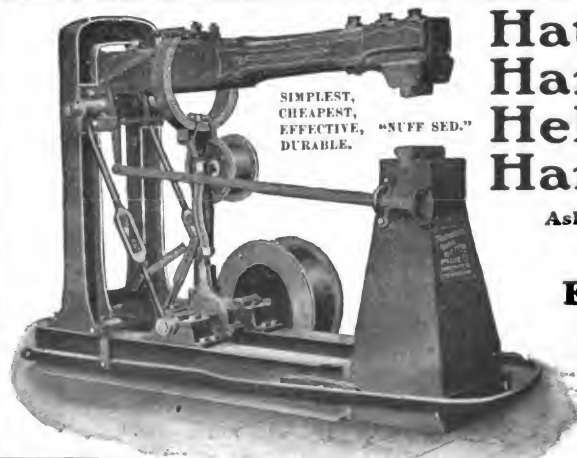
Is the adjustable pole support. Tested on the Roughest of Roads. Made for either two or four horse wagons.

WE WILL SELL

State Rights to manufacture. It's a good proposition. Write for particulars.

THE POLE SUPPORT CO.

P. O. Box 874, NORTH YAKIMA, WASH.



SIMPLEST, CHEAPEST, EFFECTIVE, DURABLE. "NUFF SED."

Hathorn's Hard-hitting Helve Hammer.

Ask your dealer or write to

HATHORN FOUNDRY & MACHINE CO. GRINNELL, IOWA.



BUY THE BEST

Ask your dealer to show you

THE TRENTON

"It rings like a bell"

Manufactured by **THE COLUMBUS FORGE & IRON CO.,** Columbus, O.

Sole Sale Agent **HERMANN BOKER & COMPANY,**
101 Duane Street, New York City.

AN AXLE

Which is coming into favor again is here illustrated, the



Stivers — Long Swell

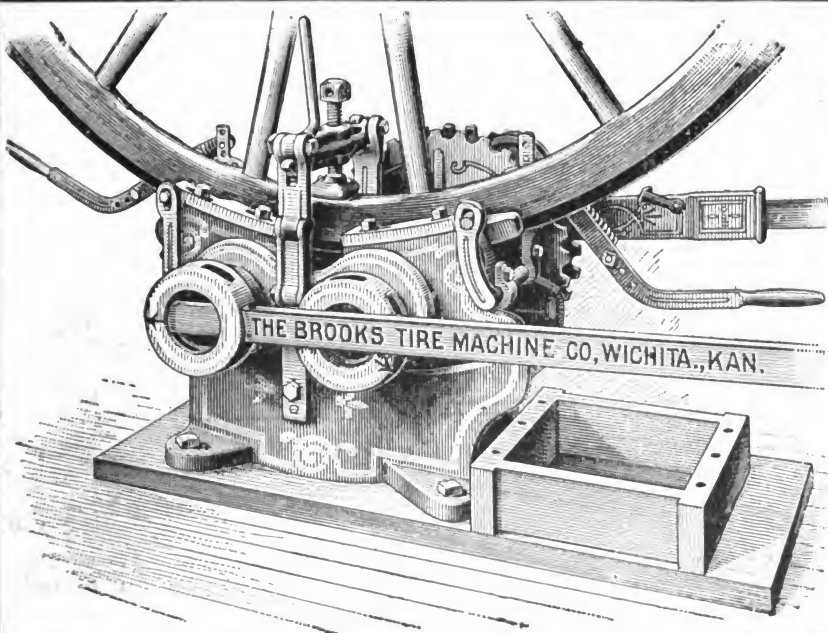
We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

If you wish further particulars Write to the

DALZELL AXLE CO.,

— South Egremont, Mass. —

The Highest Medal or Award of Merit



Awarded to any Cold Tire Setter exhibited at the Louisiana Purchase Exposition was awarded to the

Brooks Cold Tire Setter

The Experts of the Jury of Awards were convinced by the actual operation of the machine that **there is none better** and that is what our customers say.

They do the work more rapidly, with more satisfactory results and are the most durable.

Many are ordering now under our special winter terms.

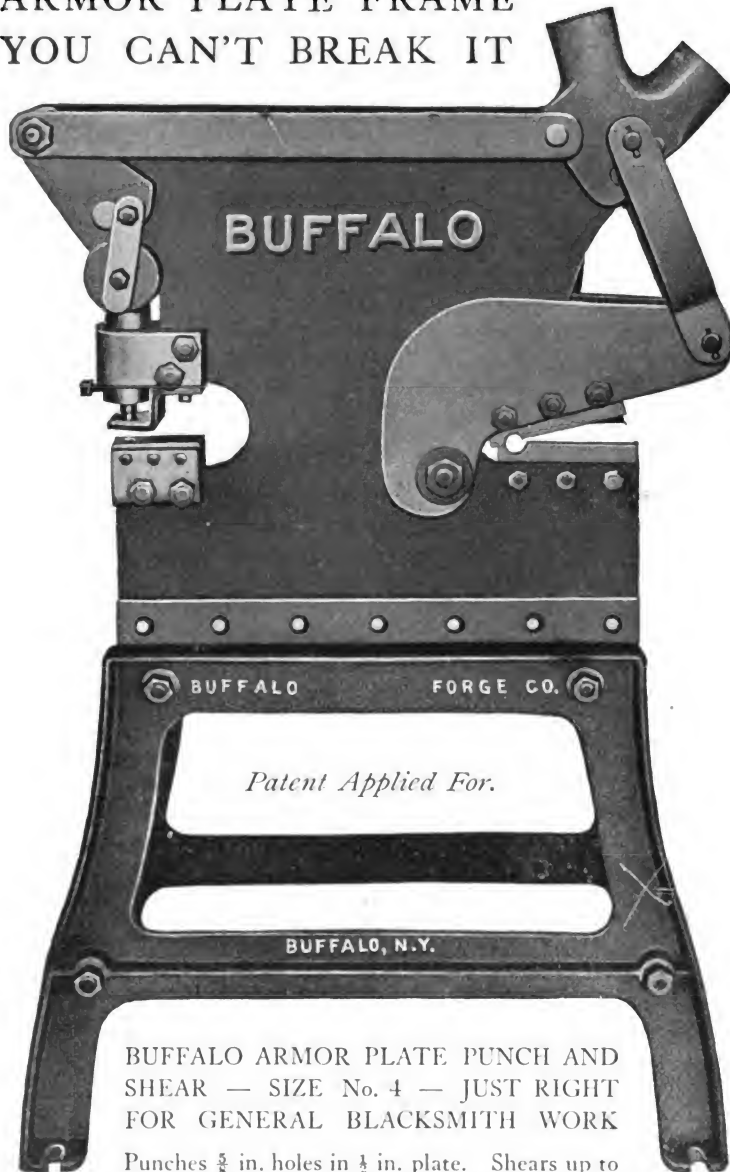
Write for these terms and complete catalogue and testimonials.

THE BROOKS TIRE MACHINE CO.

121 N. WATER STREET, WICHITA, KANSAS

Buffalo Punch and Shear

ARMOR PLATE FRAME
YOU CAN'T BREAK IT



Patent Applied For.

BUFFALO, N.Y.

BUFFALO ARMOR PLATE PUNCH AND
SHEAR — SIZE No. 4 — JUST RIGHT
FOR GENERAL BLACKSMITH WORK

Punches $\frac{5}{8}$ in. holes in $\frac{1}{2}$ in. plate. Shears up to
 $\frac{3}{4}$ x 3 in. bars (cold). Depth of throat, $5\frac{1}{4}$ in.
Height over all, 44 in. Weight, 345 lbs.

SEND FOR CATALOG OF OTHER SIZES
Also full line angle iron cutters and slitting shears—all sizes.

This No. 4 Combined Punch and Shear is a faithful shop servant that don't break, is always ready for odd jobs of all sorts, and earns a revenue each month. You cannot break the frame. It is made of Armor-plate steel with jaws, guard plate, sockets, links, die block, plunger, etc., machined from solid forged stock. The jaws are of large proportions for the work, avoiding all springing or twisting. A Guarantee Certificate protecting you against repairs from breakage of frame for five years is given with each machine sold.

Now, to get one machine in each county, quick, which will bring more orders than all the printers' ink in America, we offer free a No. 66 or 68 Buffalo Drill with the first one sold in every county. Write for full details.

BUFFALO FORGE COMPANY
BUFFALO, N. Y., U. S. A.

PUT A Roller-Reach-Iron

On the next farm-wagon you build or repair, and see the satisfied smile on your customer's face.

No sway-bar or hound to grease, little or no wear on irons, put on same as old Rub-iron

20 cents each. 10 or 25 in box.

W. T. Daum & Bro.
Austin Station, - - CHICAGO.



WE BUILD

**Power Punches,
Lever Punches,
Lever Shears and
Bolt Cutters.**

We equip shops and factories with Power, Gasoline or Steam Engines. We make all kinds of dies and special tools for the trade. Write for free booklet. Address,

**WALKER TOOL CO., 205 Lee St.
Lansing, Mich.**

A WONDER WORKER

**NORTH STAR
HARDENING COMPOUND
WORKS LIKE A CHARM**

For steel, especially plow lays, it can't be beaten. Makes them hard and tough, but will neither warp nor crack them.

GUARANTEED TO ACT AS REPRESENTED.
\$3.50 Per Box. Enough for 48 gallons of water.
Orders up to March 15th will be filled at \$3.00, express paid.

WRITE FOR PARTICULARS.

**J. M. PRAZAK, EVANSVILLE,
MINN.**

THE HELLFIRE ELECTRIC BLOWER

Direct-connected to General Electric Co. Motor

IS THE BEST

LOW
PRICE

PROMPT
DELIVERY



Write for descriptive circular and price list.

The Electric Blower Co.
141 South Clinton Street
Chicago, Ill.

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EVERY SMITH would do well to have in his library copies of these books.

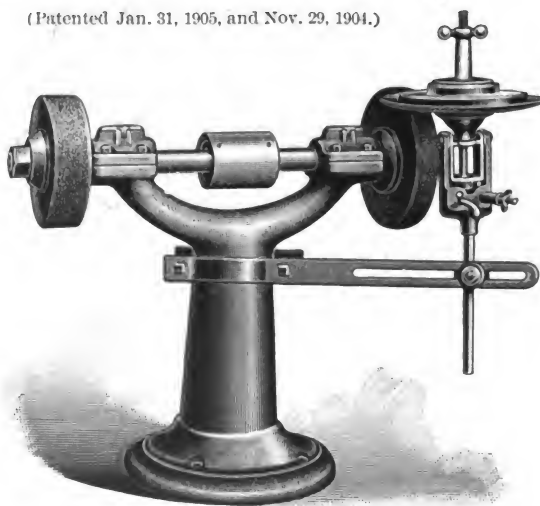
Forge Practice.....	1.50
Text Book on Horseshoeing.....	2.00
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We can supply them. Do you want to know more about them? Address

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(Patented Jan. 31, 1905, and Nov. 29, 1904.)

PERFECTION
DISC SHARPENER

Emery Stand Attachment.

This sharpener is neat, durable, compact and economical, and has perfect adjustments. Will sharpen any sized disc with any desired bevel and works noiselessly, automatically and rapidly without heating or drawing the temper. It sharpens the disc perfectly, requires little attention and pays for itself daily. Can be varied to fit any stand and will last a life-time.

IMPORTANT

You cannot find a sharpener anywhere that will do work as good or requires as little labor or attention as this; nor can you find a sharpener anywhere that will pay for itself as quickly as this—a strictly first-class sharpener at small cost. Fully guaranteed. Shipped on trial to responsible parties. For sale by jobbers or shipped direct.

R. M. HAMMOND COMPANY,
DOWNS, KAS.

LAFFITTE

Welding Plates

F. R. PHILLIPS & SONS CO.,

PENNA BUILDING, PHILA.
Sole American Agents.

EXTRAORDINARY RESULTS

Makes difficult welds easy. Any blacksmith can use them, saving $\frac{1}{2}$ in time and fuel. Used by leading railways and works all over the world.

A SINGLE TRIAL IS CONVINCING.

FREE SAMPLES AND PRICES SENT ON APPLICATION.

Buffalo No. 200

BUILT ON MODERN MECHANICAL

These are cut spur or helical gears, with broad, heavy teeth. They are not spiral gears which cause friction and soon wear out. They are not spiral gears which get out of alignment, the objectionable feature of all spiral geared blowers. (Ask your brother smith, who has the spiral kind, how many repair bills he has already paid, and will have to pay within five years). Any part of the Buffalo No. 200 or 201 blower wearing out in five years will be replaced free of all charge.

See guarantee bond, next page.

Note the large proportions of these gears.

They are mounted on a heavy cast iron frame, entirely independent of the case. They are in a straight line and must run true. Frame prevents any possibility of their getting out of alignment. The entire mechanism is self-contained. Remove the gear case and the gears run the same as before. The case serves merely to keep out the dust and furnish the oil bath. These gears are as accurately cut as those on the finest machine tools. There are no brass boxes to wear out. The cold-rolled polished steel shafts run in extra long bearings bored and reamed in the solid casting. The gears run in an oil bath, insuring perfect lubrication for months without attention. An air-tight, dust-proof case protects the gears and keeps out all dust and grit. This is the only blower where the casing is adjustable for any desired angle of discharge of blast. An air meter, or anemometer test shows that this blower delivers more air with less power than any other blower in the world.

Here is how they write about the No. 200 and No. 201 blowers:

CASHION, OKLA.

BUFFALO FORGE CO.

GENTLEMEN:—It has been about a month since I received the No. 200 blower. I have been trying it thoroughly and would say that is the best blower I ever saw. I have tried all the other kinds from first to last, and in my estimation the No. 200 blower is the only one fit for a blacksmith fire. I have a power blower with a switch and blast gate connected to the same fire. The No. 200 does so much better than the power blower that I have to partly close the blast gate."

Yours truly, L. H. BURCHETT.

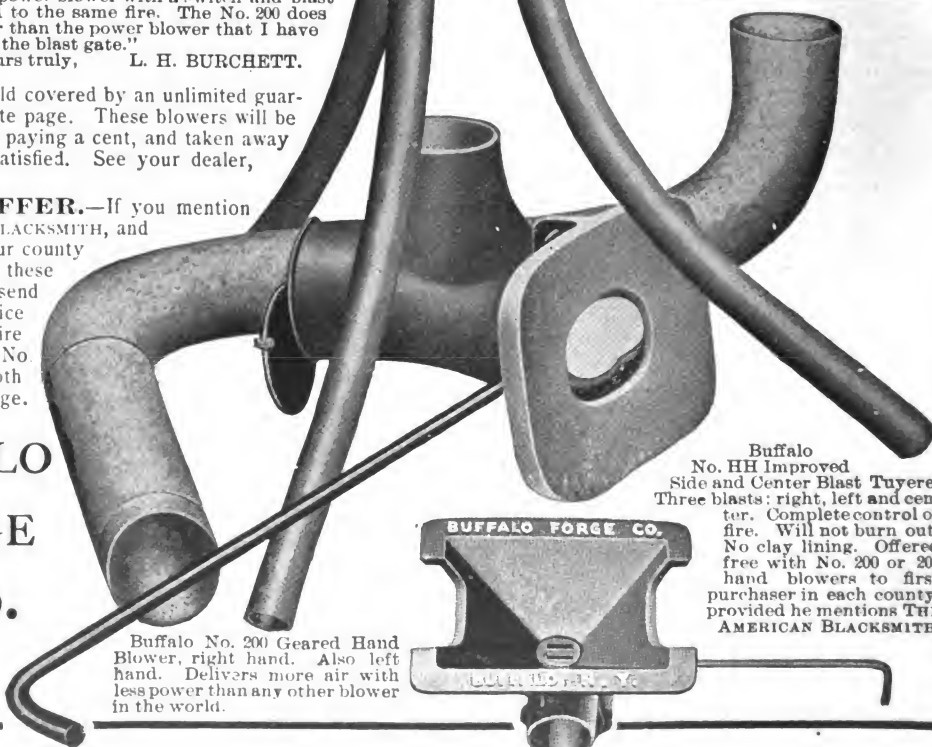
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SPECIAL OFFER.—If you mention THE AMERICAN BLACKSMITH, and are the first in your county to order one of these blowers, we will send free your choice of a No. 1 Tire Upsetter, or No. 111 Tuiere. Both described on this page.

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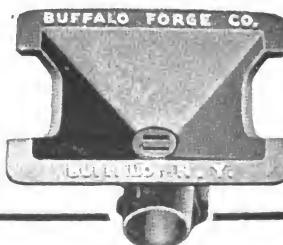
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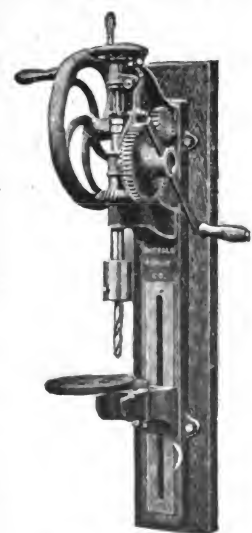
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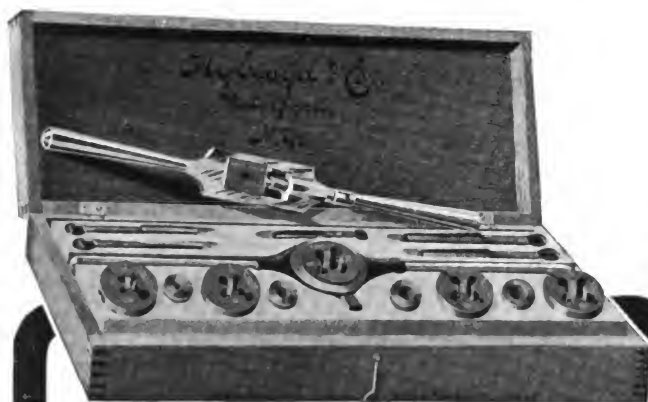
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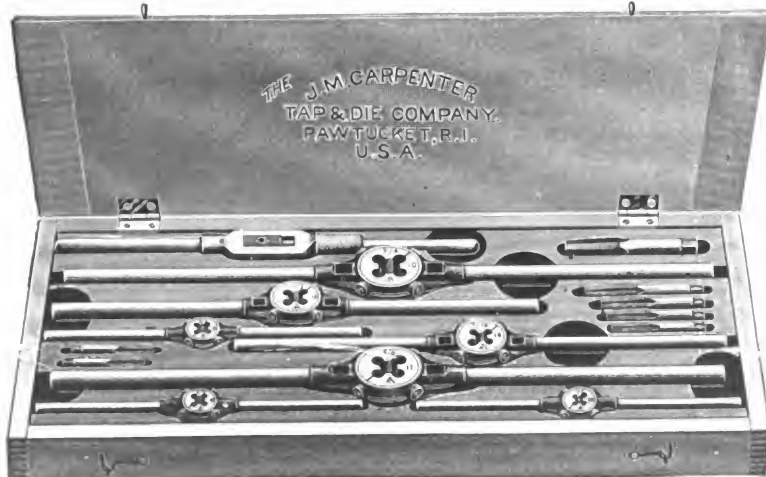
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THE AMERICAN BLACKSMITH

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A Spirit to be Cultivated.

There are many able smiths who take special delight in teaching the young craftsman some valuable lesson, learned only after years of experience. This spirit is indeed a benevolent one and should be practiced by more of our readers. The greatest thanks which the giver can experience is the satisfaction of knowing that his lesson has done some good. On the other hand, the apprentice or inexperienced smith cannot express his full gratitude for being shown a new method which proves invaluable.

In order to bring your ideas before the greatest number and thus do the greatest good we offer the use of our columns to those experienced smiths who wish to give sound, practical information to our many subscribers. Upon what topic will you write? Our readers always appreciate the articles of their fellow workmen. Then again, where opinions differ, a discussion is the best way of getting at the true facts.

Are You Satisfied?

Some people are easily pleased; others are never satisfied. It is indeed a difficult matter to please everybody—in fact it is a task impossible to accom-

plish—but it has always been the policy of the AMERICAN BLACKSMITH to please the greatest number.

It is with this thought in mind that we again solicit from readers their opinions of the articles we are publishing. As a rule our subscribers are quite frank in acknowledging the practical value of the subject we treat of in these columns, but as we believe there is always room for improvement in all things, we therefore ask for your criticisms. We want our subscribers to feel that the paper is printed for them; that it is our desire to publish articles which will do the most practical good. The question, then, is this: Are you satisfied that you are getting the greatest possible good from the articles we are publishing? In the course of a year are you getting the most practical value and information directly interesting to you? If you are—tell us so and we will thank you for the encouragement; if you are not—tell us how we can make the paper more interesting and we will gladly consider your suggestions. But rest assured, no matter which form your criticism may take, it will be received in the proper spirit.

Prosperity in the Iron and Steel Market.

The present condition of the iron and steel market has aroused much attention. Probably in no other branch of trade has 1905 prosperity shown itself so prominently, and the increasing interest will no doubt make this the greatest year in the history of this most important industry.

At the present time, indications for an increased business in this line are not welcomed with so much enthusiasm, for the manufacturer is said to be far behind in his deliveries, though the tonnage produced and taken has been of unprecedented volume.

The accelerated pace developed since the opening of the year has never before been witnessed. The month of January saw a record-breaking output. February experienced an increase over January and as a result prices went steadily

upward in response to a demand far greater than the supply. During this second month a number of additional furnaces were placed in blast and the weekly manufacture of iron then, for the first time, exceeded 400,000 tons. In spite of this, the United States Steel Corporation, it is stated, was compelled to buy pig iron in large quantities from private firms for the needs of its own steel mills.

It is seldom that one particular branch of industry witnesses such marked and decided developments in so short a time. However, at the opening of the present year promises were bright for business prosperity and it is believed that conditions in all other trade circles will be equally gratifying before the year closes.

Another Use for the Windmill.

In many cases the ingenuity of the less fortunate smith, who could not afford to install power in his shop, has been directly responsible for his worldly progress. Originality coupled with practical common sense is a combination which seldom fails to produce satisfactory results. During the career of THE AMERICAN BLACKSMITH we have come across many clever craftsmen who by some ingenious idea succeeded in figuring out a scheme to run their shop machinery. Gas engines, steam engines, electric motors and water wheels all play a prominent part in this line and even horse power has been used for this purpose, but the most interesting method of operating shop machinery that we have yet heard of came to our notice but a few days ago when one of our friends on Prince Edward Island wrote us that he had harnessed up a windmill. This clever smith says he has used a wind mill for this purpose for many years and finds it very handy for driving his turning lathe, drilling machine, emery wheel and Buffalo blower. Situated as he is on an island in the Gulf of St. Lawrence, he of course finds plenty of wind to operate his power apparatus. Very little trouble is experienced on this score and besides,

a windmill needs practically no attention as compared to the operation of an engine. Again there is no direct expense attached to this power plant and its economical value is a point of considerable merit. An engine requires quite an amount of fuel to run it properly and in these days when the price of fuel is none too cheap the smith finds his coal or gas bill rather large.

Of course a windmill cannot be used in every locality for this purpose, but the scheme simply illustrates what a man can do if left to his own resources. The idea, however, of employing a practical method of this kind should be an incentive to the observing smith and should set him thinking how he can improve the condition of his shop with the least expense. As a rule, anything labelled "home made" is considered invaluable. Besides, a man takes special delight in seeing his own plans in successful operation.

A Short, General Talk on Horseshoeing.

In speaking of horseshoes and horseshoeing a well-known authority says in part; the horny casing of the foot of the horse while quite sufficient to protect the foot under natural conditions is found to wear away and break. However, this is obviated by attaching a rim of iron to the hoof—a simple device which has probably not been surpassed in its beneficial effects by the introduction of steam-power locomotion. The horse itself has in a very marked degree been modified by shoeing, for without this we could have neither the fast racers nor the powerful cart-horses of the present day.

Shoeing does not appear to have been practiced by either the Greeks or Romans; but there is evidence that the art was known to the Celts. It is only recently that horseshoeing was introduced into Japan, where the former practice was to attach twisted whisks of straw to the animal's feet. These slippers, if they may be so called, were renewed when necessary.

In modern times much attention has

been devoted to horseshoeing, with the result of showing that the methods formerly used caused cruel injury to horses and serious losses to owners. According to a British veterinary inspector, the evils were caused by paring the sole and frog; applying shoes that were too heavy or faulty in shape; using too many and too large nails; applying shoes that were too small, paring the feet to fit the shoes, and rasping the front of the hoof. According to modern principles, shoes should be as light as possible; the ground surface of the shoe should be concave and the face applied to the foot, plain; heavy cart horses only should have toe and heel calks on their shoes to increase their foothold; the excess growth of the wall or outer portion of the horn

Each one of these shoes can boast of having been presented by a member of the nobility. The curious custom, according to which every Peer on first passing through Oakham left a horseshoe or a piece of money to have one made, to be hung in the castle, has many explanations. Some say that Queen Elizabeth started the quaint custom, while others, having more regard for historic fact, believe that the Ferrers, Lords of Oakham, were entitled to claim a shoe from every horse ridden by a member of the nobility on their passage through the town, unless redeemed with a piece of money.

The horseshoe said to have been presented by Queen Elizabeth is of very curious construction and is worthy of special notice, in addition to the fact

that the great Queen may possibly have presented it for suspension in Oakham. Other horseshoes of note are those presented by the late Queen Victoria when she was Princess; the one from her mother, the Duchess of Kent; that presented by the present King of England when he was Prince of Wales; one from Queen Alexandra; one from the Duke of Connaught and one given by the Prince Regent, who afterward became George IV.



A PORTION OF THE COLLECTION OF SHOES AT OAKHAM, SHOWING THE DIFFERENT SIZES.

only should be removed in reshoeing, care being taken to keep both sides of the hoof of equal height; the shoe should fit accurately to the circumference of the hoof and project slightly beyond the heel; the shoes should be fastened with as few nails as possible and the nails should be driven in such a manner as to take a short thick hold on the wall.

A Collection of Horseshoes, both Quaint and Novel.

Probably the quaintest and most novel collection of curios in the world is the collection of horseshoes to be found in Oakham Hall, at Oakham, a fair sized town within a hundred miles of London, England. This old castle dates back to about the year 1180 and contains a collection of between one hundred and fifty and two hundred horseshoes of all sizes and shapes.

There has been a great revival in the giving of horseshoes in the last few years and there are quite a number of modern shoes among the collection. This renewed interest is in a great measure due to the activity of the present custodian of the castle.

One of the most perfect shoes in the collection is that presented by the Earl of Linsey. This shoe was designed entirely by the giver and executed by the Uffington blacksmith. This shoe, though small, is an exact copy of a real horseshoe, has a double L in the centre and a graceful coronet at the top or toe. As noted before in this article, the shoes in this collection are of all shapes and sizes, some of them measuring as much as seven feet from the tip of the toe to the end of the heel. The smaller ones are mostly of ordinary size and are

those which have removed, perhaps forcibly, from the horse's feet in lieu of the usual payment of money.

A Word to My Brother Craftsmen.

JACOB BERGER.

Did you ever figure how much property is entrusted to your care? Have you ever counted the real value attached to all the horses you shoe during the year? This is a matter for your consideration. If during the course of a month you shoe two hundred horses and estimate the value of each at \$100, at this rate you handle yearly more than \$20,000 worth of other people's property. Now what other mechanic does this? When a horse is brought to you to be shod, it is supposed that he will leave your shop just the cost of the shoeing more valuable than when he came in. If a horse comes to you lame, or interfering, or with any defects in traveling you are supposed to treat and cure his ills. A horse that has any fault in travel is useless for driving and you alone, as a horse-shoer, are the man relied upon to correct his fault. Did you, brother blacksmith, ever consider how very important your services are to the community? If not, then start right in now and begin to think. If a physician sets a broken knee cap on a man's leg the first thing he does after finishing the job is to count the value of his services. His bill may run into the hundreds. But with horseshoers, it is very different. Some think that if we only get a chance to show what we can do, we are thankful, even if we get little or no pay.

Plans For the Making of a Cabriolet.

NELS PETERSON.

The vehicle for which plans are shown this month is called a cabriolet. Just what the name implies, I will leave to the reader. It is one of our latest styles and differs from anything built here before, in that it is much larger than this style of carriage is usually made. It will be noticed that the entire job is built on curved lines. This gives to it a comfortable and more stylish appearance than if it were straight and square cut. The advan-

tage of a cut-under body over a straight sill is readily found when trying to turn in a small space. But in order to withstand the pressure of a heavy load, it is necessary to have it built much heavier than would be the case with a straight sill body, and to make the rockers the shape as shown in the engraving. It is obvious that the grain of the wood is crossed in a number of places when sawed out and of course is thus weakened in such places and must therefore be reinforced by a much heavier rocker plate than would otherwise be necessary. Referring to Fig. 1, the side elevation, it is noticed that the part of the body which is back of the front seat is similar in shape and construction to that of a phaeton body, the rear seat being solidly built to the rocker. The sill of the rear seat is made from stock $1\frac{1}{2}$ inches thick by $4\frac{1}{2}$

like a piece of bent wood fitted over the rail and extending down over the front corner pillar and terminating with a scroll at AA. This is not the case, however, as the front pillar and arm rail are carved and fitted together, giving to it the appearance of bent wood. Two vertical cleats spaced equally between the front and back corner pillar form braces for the side panels, which are bent convex. The inner edges of the arm rail piece and the front and rear corner pillars having been grooved in to a depth the thickness of the panel, (in this case 7-16 inches) a moulding BB is fitted over the joint. The back panels of the seats are grooved into the rear corner pillar and are supported by two cleats $1\frac{1}{2}$ inches wide. These extend up a distance on the lazy back, as shown in Fig. 2, A. The wood used for the rockers is ash, which is cut $2\frac{1}{2}$ inches

by $1\frac{1}{2}$ inches, except for the front boot rest, which tapers forward to $1\frac{1}{2}$ inches at the extreme front end. Each rocker is made in five pieces. These are halved and joined together at CCCC, then ironed with a rocker plate made of stock 2 inches by $\frac{1}{2}$ inch. The bottom edges of the rocker are grooved into a depth the thickness of the bottom boards. A piece of band iron $1\frac{1}{2}$ inches by $\frac{1}{2}$



INTERIOR VIEW OF OAKHAM CASTLE SHOWING THE SHOES ON THE WEST WALL.

inches at its widest point, the front of the seat. Here it projects over the rocker three inches and then tapers backward to the rear corner pillar of the seat, where it projects over the rocker $1\frac{1}{2}$ inches, as seen in Fig. 4 at A. This frame is made in three pieces. Two side pieces and a back piece which are cut at the corners and glued and fastened together with wood screws, then securely fastened to the rocker. Two cross pieces $1\frac{1}{2}$ inches by 4 inches are then fastened on top of this frame. These pieces are grooved on the inside edges and the bottom boards of the seat are fitted into the recess thus formed. This forms the bottom part of the frame for the seat. Into it the front and rear corner pillars are fitted, forming the outlines of the seat, front and back. The top piece or arm rail is made out of stock, $1\frac{1}{2}$ inches by $2\frac{1}{2}$ inches. Looking at Fig. 1, it appears

inch and extending the full length of the body is fitted over the joint, as shown in Fig. 4. The plate at D securely fastened with bolts forms a perfect clamp for the bottom boards. The width of the body across the rockers outside to outside is 34 inches. The width of the sills of the seat being forty inches makes them project over the rockers three inches on each side. A filler is put on which tapers downward, running out to nothing. The beveled edge moulding extending downward from the seats covers this piece and extends forward on the front boot rest to the front end and terminates with a scroll on the boot rest for the back seat.

The body having been completed, a gear must be made to correspond as near as possible to the shape of the body. To hang a body of this shape on a straight reach gear would not look well, since it would necessitate the raising

of the body to a height out of proportion. To look well, therefore, a bent reach conforming to the shape of the bottom of the body must be used, as no part of the body should hang closer to the reach than the height of the opening between the springs. In this case it is eight inches. The bottom of the boot rest for the rear seat projects downward three inches more than any other part. The bend in the reach at this point is also three inches lower than any other part of the reach and permits of hanging the body quite low, thus making it easy to mount and

for this job. Bringing our measurement backward to locate the center of the rear axle, we must know the height of the back wheel to be used. Having the large step in place and space taken up by the curve in the fender, then allowing not less than $2\frac{1}{2}$ inches space between the fender and the rim of the wheel, and the wheel being 46 inches in diameter, necessitates a reach 7 feet long, which is also the length of the boom of the body.

Having the woodwork laid out and completed ready for the blacksmith to iron off, we proceed to iron the run-

length for drilling a hole, into which the bolt end of the heelstrap is inserted. To make the side-stays, a piece of 1-inch by $\frac{1}{4}$ -inch bevel edge iron is used. The front end is bent at a right angle and a hole drilled which makes the bolt passing through the headblock. To this is welded a piece forged out of $\frac{7}{8}$ -inch square iron, forming a boss, as shown at A, Fig. 5. This piece is then bent edgewise to fit the shape of the reach. The rear part of the stay is made of $\frac{3}{8}$ -inch oval iron, the heel piece being forged first and then welded at B. The three oval pieces are then

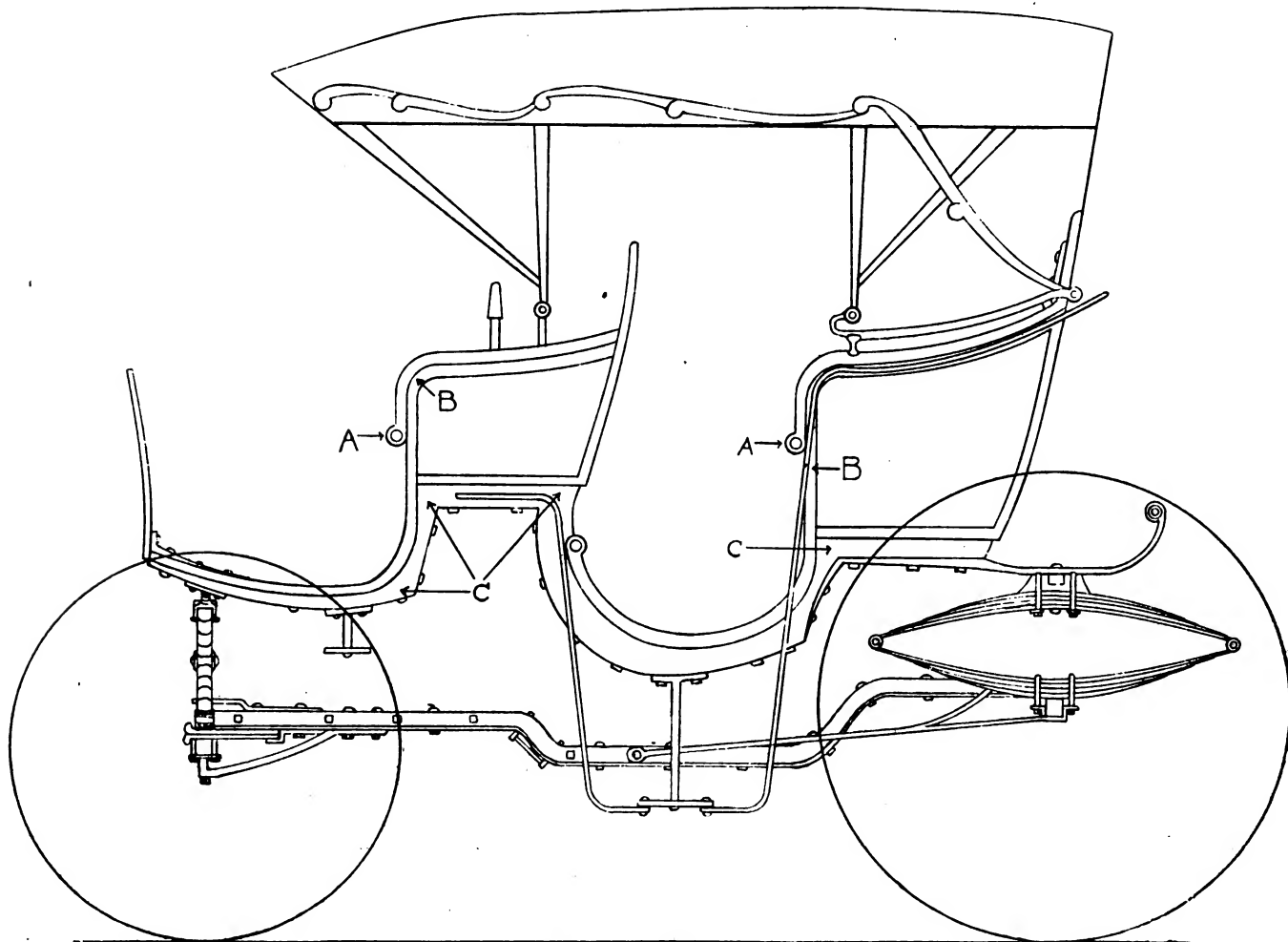


Fig. 1.—SHOWING SIDE ELEVATION OF CARRIOLET.

dismount, another good talking point for a cut-under job. To get the length of the reach, it is necessary to know first the width of the track to be used; for this job it is 4 feet 8 inches. The dish of the wheels, which is $\frac{1}{2}$ inch with the axle set for plum spoke, would make the width of the track 4 feet 10 inches, half of which is 2 feet 5 inches. Now measure from the center of the wheel forward 2 feet 5 inches and you locate the place where the center of the front spring bar will come. This gives us a point to measure from to obtain the length of the reach needed

ning gear first because some of the irons, for the body could not be properly fitted until the gear was set up and the body suspended over the gear in its right position. It matters not whether the axles or tires are done first, but if you haven't a gage for setting axles, the tires would have to be put on the wheels and boxings driven in the hub before the axle could be set. Having the axles welded, we proceed to make the reach plate which is of $1\frac{1}{4}$ -inch by 5-16-inch stock, bent and fitted to the shape of the reach and extending back past the end of the wood a sufficient

welded together at C. The back brace is next bent to shape and fitted to its place before welding at D, thus completing the side stay.

In Fig. 4 it will be seen that the rear springs are fastened to the axle by means of an iron lug through which two saddle clips pass. These lugs were forged out of $1\frac{1}{4}$ -inch by $\frac{3}{4}$ -inch Norway iron. First the end of the iron is upset to a thickness permitting its being worked into shape, as shown at A, Fig. 6, then it is bent and worked to sharp corners, as shown at B, and finally bent and fitted to the axle, as at C. Having

the gear finished and set upon the floor, the body is then suspended over the gear in its proper position. It is usual to place a bench level on top of the body to see that it hangs level, but for bodies of this style it is better to step off a distance from the job and view it from different positions. It is possible to get the proper poise of the job, without the use of the level, provided you have a good eye. Now we can proceed to get measures for loops and springbars. The back loop for this job is made of $1\frac{1}{4}$ -inch square iron and is shown in Fig. 7, A. The flange is welded on as at B and is a piece of iron 3 inches by $\frac{1}{2}$ inch and $4\frac{1}{2}$ inches long. The pieces are scarfed as shown, the square iron being scarfed where the flange is to be welded on by taking a thin fuller and sinking it about $\frac{3}{8}$ of an inch into the stock, then turning the iron over the corner of the anvil, the helper striking on the fuller. The corner is drawn out to form the lap. When ready for welding, the pieces are placed together as shown in the engraving and struck with the sledge. The pump handle is made of $\frac{7}{8}$ -inch square iron drawn out oval for a distance of 8 inches and cut off, leaving the stock full size at the end. This is worked into a scroll-like shape, as shown at C, a $\frac{3}{4}$ -inch hole drilled and a piece of 2-inch iron inserted and then brazed.

The pump handle is then shaped and welded onto the loop at D. It was desired to have the top put on this job so that it could be readily removed, and the carriage used as an open one. To do this it was necessary to have on the back seat a shifting rail which could be taken off with the top. Fig. 8 shows the rail. It is made of $1\frac{1}{4}$ -inch by $\frac{3}{4}$ inch iron. To form the back props and corners, the irons are split as shown at A, then worked down with the set hammer, as at B. D is worked out to form the prop and C is drawn out to $\frac{3}{4}$ -inch oval to fit back of the seat. To this the back stays of the top are fastened. Then with the aid of a set hammer and swage the little lug shown at C is made. The gooseneck is made from the same size iron.

The step to which the fenders are fastened is made of $\frac{7}{8}$ -inch square iron, the end of the iron being upset to a shape as shown in Fig. 9, A. A piece of $1\frac{1}{4}$ -inches by 7-16 of an inch and $4\frac{1}{2}$ inches long is used for C. A half inch round piece of iron is used for the branch brace. The front step has three prongs and no branch brace. It is of $\frac{7}{8}$ -inch square stock split diagonally by plac-

ing it in the square hole in the anvil and then cutting.

The boss trimmer tells us that to iron the seat properly the gooseneck on the front seat should be one inch higher than the gooseneck on the shifting rail of the back seat, because when it is desired to let the top down, the front bow is moved back and inserted into a hole in the back bow.

liable to strike the lamp. The trimming for the seats is of dark blue broadcloth, 16 ounces to the square foot. The body is black and the gear an olive green. The striping and other trimming of body and gear is carmine.

Of course almost any pleasing combination of colors can be used by the builder. The style in different sections of the country varies. Should the

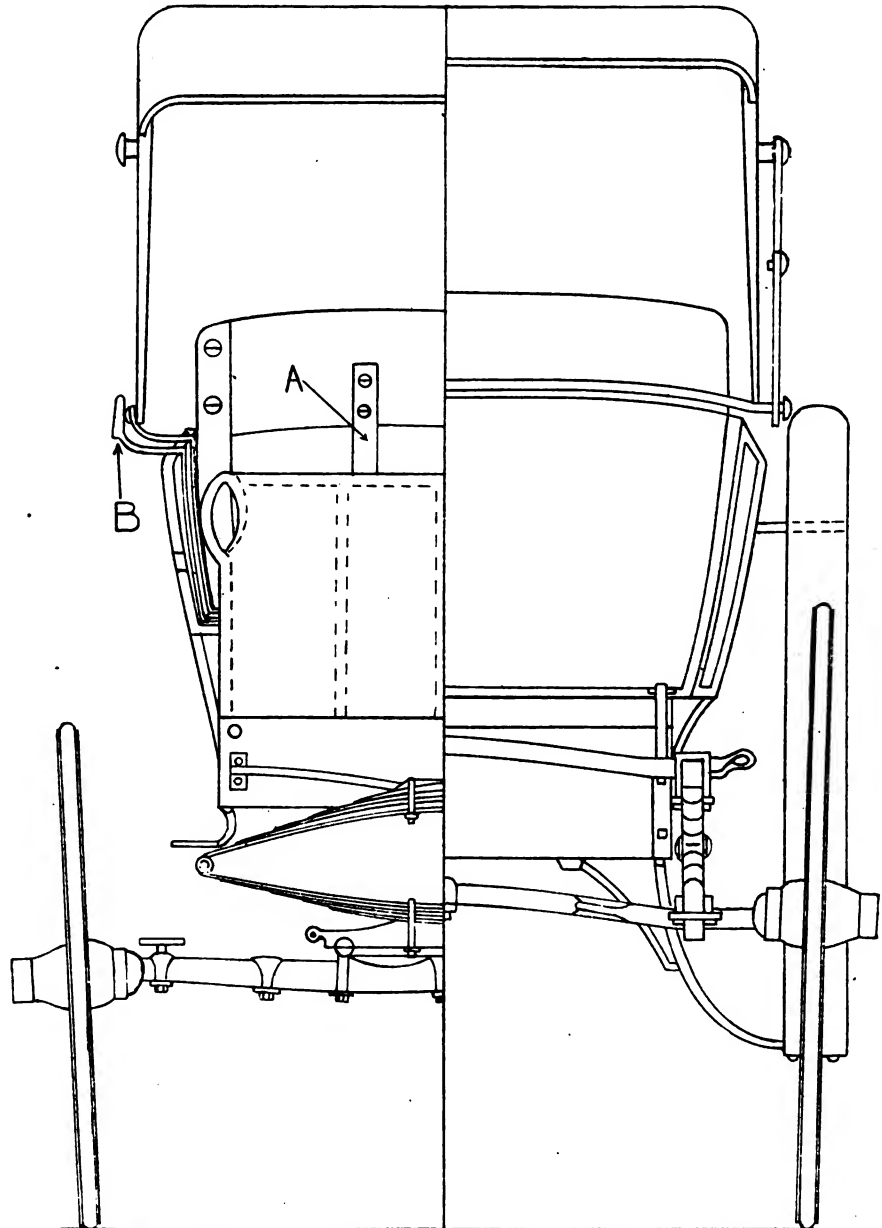


FIG. 2—SHOWING FRONT ELEVATION OF CABRIOLET.

FIG. 3—SHOWING REAR ELEVATION OF CABRIOLET.

This hole is one inch above the hole fitting the gooseneck of the shifting rail and if the bows were made the same lengths, the front part of the top would have to be forced upward one inch. By repeated shifting back and forth the stitching along the quarter line of the top would be liable to rip. The lamp iron, B, Fig. 2, should be made to extend out past the gooseneck. Otherwise the front bow of the top is

builder make the vehicle to order the customer's wishes must be considered in this matter.

Wheel-Making and the Preparation of Wheel Timber.

A Lecture Delivered by Mr. H. H. Lockwood before the Technical School for Carriage Draftsmen and Mechanics, 222 Bowery, New York City.

In the manufacture of wheels, the primary and most important thing is the selection of timber. For hubs, elm

is almost universally used in this country, and some elm hubs are exported to Europe. For heavy wagons and trucks, locust is used to some extent in the West. For the spokes and rims, both hickory and oak are used, hickory predominating, especially for spokes. As the selection, preparation and seasoning of the timber are most important, we will give briefly the methods employed to obtain the timber and prepare it for the wheelmaker's purpose.

Let us take the hub stock first, as this

As soon as the trees are cut, they should be hauled at once to the hub factory, as lying upon wet ground for any length of time injures the log. Hub makers buy the log at a fixed price per running foot, based on the quality and thickness, the average price for good New Jersey stock being about one cent per running foot for each inch in diameter of the log measured in the centre. Thus, logs measuring from 5 to 10 inches in diameter at the centre would range in price from 5 to 10 cents per running

it so as to get all the circulation of air possible. The roof must be tight, and if the sides are not enclosed, the roof must extend far enough over the pile to prevent any rain from driving in at the sides. These logs remain piled in this way for a year, and are then sawed up in blocks of a proper length for the hubs they are intended to make. They are generally cut one inch longer than the hubs are expected to be when turned. Thus stock for hubs five inches and under would be cut about six

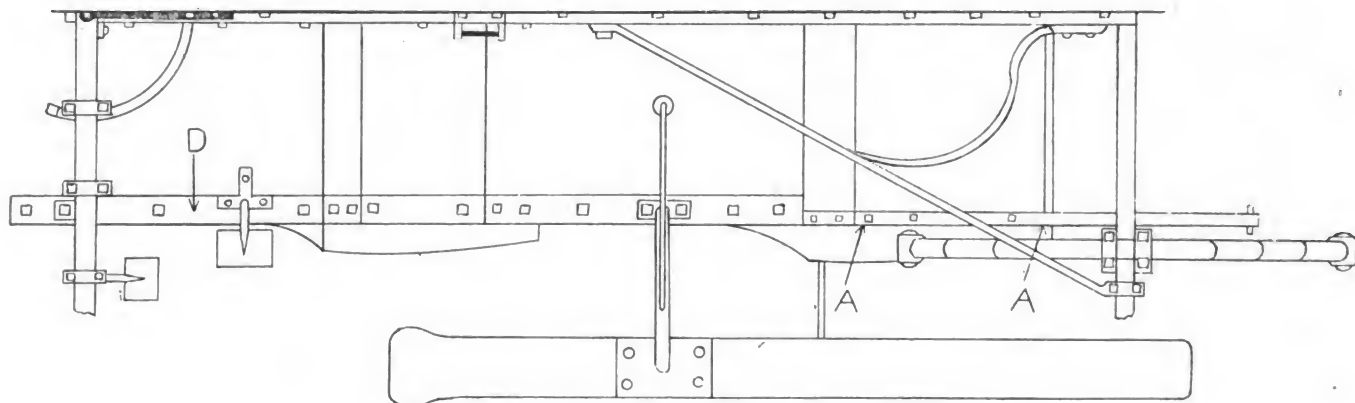


Fig. 4.—SHOWING BOTTOM PLAN OF RUNNING GEAR AND BOTTOM OF CABRIOLET.

timber requires the most time and the greatest care in its preparation. The best elm for hubs is found in the Northern counties of New Jersey, in Connecticut and Delaware, some fairly good stock also being obtained from Eastern Pennsylvania and New York. Elm best suited for hubs grows on stiff clay soil, or damp, stony ground. The trees that grow within thirty or forty miles of the sea coast, in the right kind of soil, are the best. Trees that grow in the open, in old pastures, or along fences, are of firmer and tougher fibre than trees found in the forests. The logs are cut when the trunks obtain a diameter of from 4 or 5 inches up to 10 or 12 inches, depending upon the size of hub required, as it is essential to have the sap or outside growth on the face of the hub. The right season to cut the timber is after the leaves fall and the sap descends. Cutting usually begins about October 15th, and continues up to January 1st. The finest hubs in the logs are those nearest the butt of the tree. Above 6 or 8 feet, the quality deteriorates rapidly, although hub makers who have a demand for low grade stock, usually accept logs in the larger sizes up to 12 or 16 feet in length. Exacting carriage makers, who make their own wheels, and use the finest stock, contract for the first three or four cuts from the butt end of the best log, securing in this way, the very choicest quality.

foot. This of course, is only approximate, prices varying in different localities, dependent upon quality and nearness to market.

When the logs are received, the hub maker is careful to pile them on skids so that they will not come in contact with wet ground. The logs are then treated by either one of three methods. The first and best is what is termed "rossing" the timber. All the outer

inches long, while stock intended for coaches and broughams would be cut 8 to 9 inches long. The blocks are then placed in a lathe and just enough of the outer cap taken off to make them round. A hole about one inch in diameter is bored through the center, and the ends dipped either in melted resin, or a mixture of linseed oil and white lead. These "hub blocks," as they are now termed, are again piled in dry sheds,

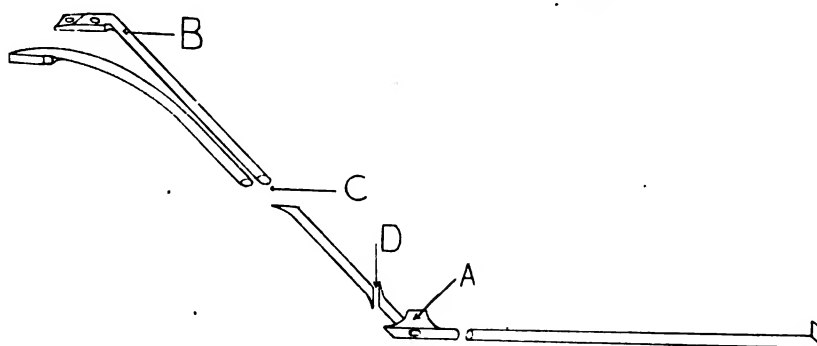


Fig. 5.—SHOWING METHOD OF MAKING SIDE-STAYS.

bark is removed, and if long sticks have been taken, the top or part above 6 or 8 feet from the butt is cut off, to be treated by the third method, and these butts are then carefully piled in well ventilated sheds, care being taken to have at least two feet of open space between the first layer and the ground. The pile is then carried up to the roof of the shed, if necessary, laying each course at right angles to the course underneath

care being taken to pile them in such a manner on end as will afford as good a circulation of air through the pile as possible. At intervals of from two to four weeks, they are turned and repiled so that the sap will settle uniformly throughout the blocks. After remaining in the shed from six months to a year in this state, they are ready for the market, if the hub maker does not turn them to order, and most wheel makers

now prefer to buy the block in this shape, and turn them in their own shops.

The second method differs from the first only in keeping the logs seasoning for a year before cutting up into blocks. In this method the green logs have the bark removed and are immediately cut up into the required lengths, turned, and the ends coated with resin or oil and lead, and are at once put into the curing shed. This hastens the seasoning and enables the maker to get his stock into the market six to nine months

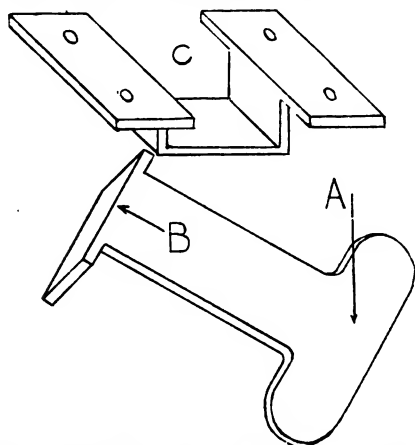


Fig. 6.—SHOWING METHOD OF FORGING SPRING LUGS.

sooner, but greater care has to be exercised in looking after the blocks for the first three or four months and keeping them turned and exposed to the air, as the fresh sap settles quickly to the lower side, sets up mildew or fermentation, the outer surface is discolored and ultimately dry rot sets in. In this method the percentage of loss is greater from mildew and checking than by the first method, and where carelessness or neglect occurs, the loss is very great.

The third method is pursued where it is desired to get out stock as cheaply and quickly as possible, and consists in steaming the blocks thoroughly after they are turned and bored, then dipping the ends in melted resin as soon as they are cold. The steaming process forces out the sap and fills the pores with hot water, which dries out more rapidly than the sap does, and thus enables the maker to get his stock in marketable condition much quicker than by the other methods. This process, however, deteriorates the quality, and is chiefly used in the preparation of the lower grades of cheap hubs.

Special methods for hastening the curing of the blocks are in use among the makers, for all of the foregoing have a tendency to deteriorate the quality of the timber to a greater or less degree.

We will next take up the spoke timber. This for all vehicles, except

very heavy trucks and wagons, should be hickory. For spokes $2\frac{1}{2}$ inches in width and upward, fine grain tough oak is used to some extent, and answers a good purpose, but probably 90 per cent. of all wheels made in this country are made with hickory spokes, and American hickory spokes are now exported to all parts of the world where good carriages are made.

While the area of country where good hickory is obtained is more extended than where the elm and hub stock is found, it is true that the very best grows in the same localities, and under much the same conditions of soil, and proximity to the sea, as in the case of the elm, but the region where fairly good hickory is found extends further down the seacoast, much of the good spoke timber now being obtained in Virginia and North Carolina, while the stock of New Jersey and Connecticut was largely exhausted years ago, and can now be obtained in these localities only in small and scattered lots. The large wheelmakers are now going into the Southern States almost exclusively for their main supply of hickory. The hickory should be cut at about the same season of the year as the elm, although this rule is not so generally observed, and the consequence of violating it not so injurious to the stock. The trees are designated in the trade in two ways:—second growth and forest hickory, the first being the young growing timber usually found in open spaces, and the second, the old matured logs found in the forests. Second growth stock is the finest grain and most lasting, and is

the logs are carted to a nearby mill, and there cut in the requisite lengths, and the stock sawed instead of split into pieces the right size for turning. This method works up the stock closer and more economically, giving a larger percentage of product, but the split or riven spokes are best for good work, as in the latter, the fibre of the wood is kept straight in the turned spoke. The sticks thus prepared are then piled in dry, well ventilated, but enclosed sheds, in such a way as to give them uniform exposure to the air, but protect them from drafts and sudden changes of temperature, and are left to season for a time, depending upon the exigencies of the factory. After seasoning from four months to a year, they are placed in kilns, and dried with artificial heat until all the moisture and sap is expelled and they become hard and thoroughly dry. They are then placed in what is known as a spoke lathe, and roughly turned to the desired pattern, leaving the end to be tenoned, rough and unfinished. This is called a club end or club spoke. The club spoke next goes to the sander, a wide, coarse sand belt, over which they pass diagonally. This smooths up the rough surfaces left by the lathe, and they are then ready to be tenoned, faced, throated and tapered, for the special kinds of wheels they are designed for. After this work is done, they are again polished, on a fine sand belt, which completes them ready for market. Many of the wheelmakers prefer to buy the club spokes and do the final work in their own shop. The grading or sorting of spokes is usually done

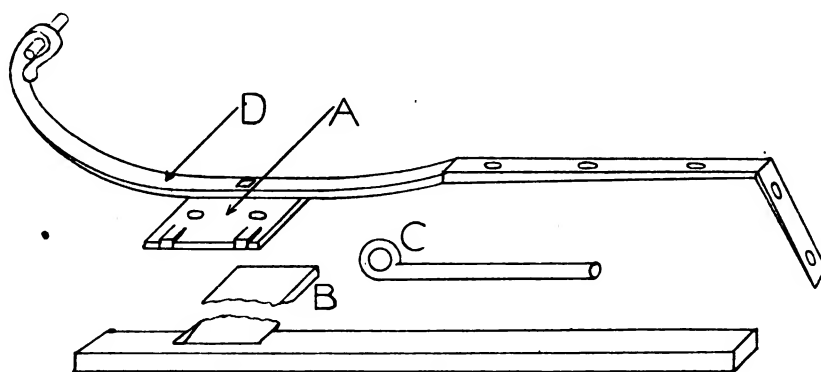


Fig. 7.—SHOWING METHOD OF FORMING PUMP HANDLE.

essential in all light wheels. Some of the forest growth is hard and firm, and answers a good purpose where very stiff stock is desired, as in the case of heavy wagons and trucks. The trees, when felled, are either cut up in lengths of 28 to 36 inches, on the ground, and then split up into sticks about the right size for turning the spokes required, or

after the sand belting, by trained experts, who sort them into four, or even five different grades, which are designated by makers' brands or numbers, running all the way from the choicest heavy, fine grained stock down to the culls. The forest hickory is kept separate and usually graded as first and second, and is sold at a lower price.

For rim stock, the larger and choicer hickory logs are selected, those that will cut plank from 11 to 16 feet in length of clear stock, free from knots or other defects. In cutting hickory, it is customary to reserve the logs that will work to the best advantage, for rim stock. The logs are taken directly from the mills, after cutting, and sawed into plank varying in thickness all the way from 1 to 3 inches, and are then piled

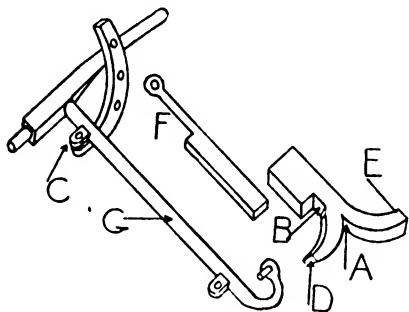


Fig. 8.—METHOD OF FORGING SHIFTING RAIL.

in dry sheds with sticks between each course. Special care has to be taken with this stock to have it dry slowly and uniformly, as otherwise the stock will check. White oak logs are treated in the same manner as the hickory, and good oak is considered even better stock by some makers than hickory for many kinds of heavy wheels. After the plank has seasoned about a year, it is cut into strips of the size required for the rims it is intended to be used for, and is again piled and allowed to season so that the freshly exposed side will dry uniformly with the face. Great care and vigilance are necessary in looking after the stock for the first few months after it is cut. When the strips are ready for bending, they are thoroughly steamed until the pores of the wood are filled with hot water, they then become very soft and pliable, and are placed in half circle moulds of the diameters required, and are forced or called into the proper position, where they remain until cold, when they are removed, and packed in binders, which hold them in the shape in which they have been bent. Eight pieces forming a set of rims for four wheels are usually packed in these binders. In this shape the rims are ready for market. In the process of bending, a steel band is always used on the outside of the rim to follow up the bend and keep the outside fibre firmly pressed toward the centre, and pressure is also applied to the end to keep the outer fibre from stretching. It is always well to use rims of about 2 inches larger circle than the diameter of the wheel they are intended for. All the stock is

now ready for the wheelmaker. In making wheels, it is important to have each in proper proportion, and the tenon part of the spoke in the hub should be at least 10 per cent. longer than the width, in light wheels, and 20 per cent. in heavy wheels. On rubber tired wheels, the width of the tread or face of the rim is usually about the same as that of the spoke at the face of the hub on heavy work, and from $\frac{1}{2}$ of an inch to $\frac{3}{4}$ of an inch narrower on light work. The depth of the rim should be the same as the width. The first process is mortising the hubs to fit the spoke in width. The spoke is then so tenoned to fit the mortise the other way, or in thickness. When the spokes are properly tenoned and fitted, they are placed on a heater with the tenons down, until they are hot. The sharp edges are then taken off the mortise in the hub, the hubs well steamed, when the spokes should be driven as rapidly as possible so as to complete the driving before the hubs cool. The wheels are then taken to the cutting off machine, where the ends of the spokes are cut off to the required length, and tenoned for the rim. The rims are faced true, then run through the rim planer, which turns them out the required width and depth. They are then fitted to the wheels, bored, rounded, sanded, and driven on in their respective places. The wheel is then taken to an upright revolving sand disc, and placed horizontally on a slowly revolving center, which carries it against the disc and to a stop. This insures a

the liberty to express my views and also my practice through the columns of THE AMERICAN BLACKSMITH.

I have no hatchet which I want to dig up and use on some one, but I merely want to state that as a rule many mechanics don't practice what they preach. I have followed the trade for twenty years and have seen all kinds of work both good and bad. But the wheel is abused more than any other part of a wagon or vehicle. I have had wheels at my shop that were more of a burlesque than the real article. Some mechanics will use a spoke $\frac{1}{2}$ inch larger than the mortise in the hub. They just trim the spoke to fit, and then put the felloes on any old way. It doesn't make any difference whether the felloes have the proper circle or not, the felloes are placed on the wheel and if they are not even at the joints the high ones are trimmed down to suit. One felloe may be $2\frac{1}{2}$ inches deep while the other is $1\frac{1}{2}$ inches deep. It is impossible to describe the shape of wheel as it is not round nor is it hexagonal or octagonal, but the wheel will have all the way from one to two dozen bumps.

When I fill a wheel I see that the mortise in the hub is clean and free of all grease and dirt. Next I select a spoke $\frac{1}{8}$ -inch larger than the mortise in the hub. I then cut this spoke down to about $\frac{1}{8}$ -inch larger than the mortise and give the back of the spoke sufficient taper to allow for the dish in the wheel. Spokes should

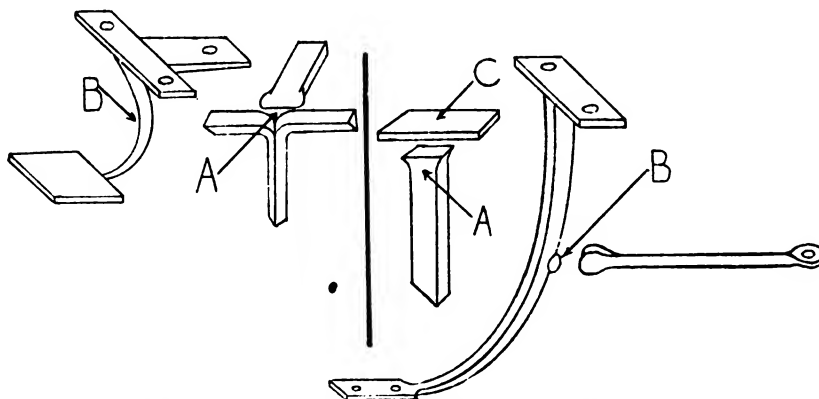


Fig. 9.—SHOWING METHOD OF FORGING REAR STEP

Fig. 10.—SHOWING METHOD OF SHAPING FRONT STEP.

perfect circle, and a flat square tread. They can then be finished in the manner in which they are desired.

The Building and Repairing of Wheels.

BY SLEDGE.

I have read so many articles regarding the building and repairing of wheels and have noticed so many conflicting opinions among the craft, that I take

always be dipped in blue before driving. I use a wooden mallet with a spring handle for driving spokes. I have a spoke tenoning machine with self centering chuck which measures every shoulder the exact length from the center of the hub. Always saw the tenon for wedging and don't split it with a chisel after the felloe is on. I use dressed felloes for all standard size

wheels as it doesn't pay to dress your own felloes unless you have a machine. In putting the felloes on the wheel see that they fit square at the shoulder of the spoke. After the joint is sawed the felloes should have an opening as large as a saw cut in their face so that the inside will close tight when the tire is set. I always saw a slot in the felloe and use a flat iron dowel pin. It is handier than a wooden pin. See that the tread of the wheel is square so that when the tire is set it will run square on the ground and not on the inner or outer edge.

Hints on the Buying and Working of Steel.

W. F. WOODSIDE.

Although tool steel is cast steel, the words cast steel are very misleading to the average mechanic. As he sees axes, hammers and various tools marked solid cast steel, he wonders how they can be made from cast steel and sold at the prices they are. They are no doubt cast steel, but very few of the low priced articles are made from the kind of cast steel he has in his mind. The cast steel he has thought of is made by a very different process. It is melted in crucibles poured into iron moulds and afterward forged and rolled into bars from which the various tools are forged or machined. The other cast steel is melted and poured into moulds which has the shape of the tool formed in it (moulds similar to those used for cast iron) which of course lessens the cost of the article and also the quality of the steel.

A question I have often heard asked is: "Which is the best steel made?" Now this question I think is too deep for anyone to answer definitely, as there are a great many makes and several grades of each make, each grade suited to some purpose and some makes better suited for some special purpose than the others. The advice of one counted an expert steel worker cannot be relied upon as to which is the best steel, because there may be one special make that stands his method of treatment best; therefore he gets the best results from it, and of course this is the best steel made in his estimation. But there may be another make, if he were to understand treating it, that would give better results. It must be borne in mind that each make varies a little in the method of treatment. One make hardens at a very low heat, the other at a considerably higher heat. So if they are all treated the same, some of them are bound to go wrong,

and of course the make that did not stand for this treatment is condemned. Another thing to remember is that each maker makes steel of different tempers, each temper being best suited for certain purposes. Some makers number each bar, others use a letter which denotes the temper of the piece. For example one maker would use the numbers as follows: number 6, razor temper. This steel is easily destroyed by over heating but if treated properly will do many times the work of ordinary tool steel on hard metals. Number 5, saw file temper. This steel will stand a little more heat than number 6, but must be handled with care. Number 4, tool temper, a very useful temper for ordinary machine shop tools such as lathe and planer tools, drills, and where the tool is not subject to blows from a hammer. Number 4, spindle temper, is a temper suitable to a great many tools such as mill picks, screw threading dies, taps, milling cutters and edge tools. Number 3, chisel temper, a temper suitable for chipping chisels or for any purpose where the head of the tool is subject to blows from a hammer. Number 2, set temper. This steel is adopted for track chisels and kindred tools where they are subject to great abuse. It welds easily and also hardens readily in water or brine but not in oil. So always in ordering steel state the purpose it is to be used for and the

overheat it. High speed steel must be thoroughly understood before it can be successfully worked.

A General Blacksmith Shop of Nebraska.

B. J. MEYERS.

I have been greatly benefited by items appearing in the paper from brother smiths, and shall certainly keep THE AMERICAN BLACKSMITH at hand as long as I am in the business. He certainly is a poor mechanic who has not some ideas that will help someone out at some time and I believe this is the proper method of keeping in touch with each other in the different lines. The accompanying engraving is an interior view of my shop, which is located at Staplehurst, Nebraska. All of the shop is not shown, of course, but the main part of it is brought out. I operate a "Hawkeye" power hammer, a Silver's drill press, a buzz saw, an emery wheel, a ventilating fan above the anvil, a blower, and a grindstone. These are driven by a 3½-horsepower Dempster gas engine, built by the Dempster Mill Mfg. Co., of Beatrice, Nebr. Gas engine power is certainly a time and muscle saver. The following is a list of our prices:

Set of four shoes.....	\$1.00
Four new shoes.....	1.60
Wagon and buggy tongues.....	2.50
Pole circles.....	.75
Bent rims, per set.....	5.00
Buggy spokes, each.....	.25.



A NEBRASKA SHOP FOR GENERAL WORK.

steel maker will select the temper most suitable and then when you find the make and temper best suited to your work, stick to it until you are thoroughly convinced there is something which is better.

In working high speed steel, it is more likely to not heat it enough than to

Wagon felloes, each.....	.25
Bolsters	1.25
Sharpening lays (all sizes).....	1.25
Pointing shovels, set of four.....	2.00
New lays 14 inches, each.....	3.50
Wagon axles.....	3.50
Sand board.....	1.00
Setting tires, per set.....	2.00
Axle stubs, per set.....	6.00 to 7.50
Sharpening stalk cutter knives, each..	.25
Sharpening listers.....	.50

The Horse's Age in Verse.

BIGGLE HORSE BOOK.

Two middle "nippers" you behold
Before the colt is two weeks old;
Before eight weeks two more will come;
Eight months, the "corners" cut the gum.

The outside grooves will disappear
From middle two in just one year;
In two years, from the second pair;
In three, the corners, too, are bare.

At two, the middle "nippers" drop;
At three, the second pair can't stop;
When four years old the third pair goes;
At five, a full new set he shows.

The deep black spots will pass from view,
At six years, from the middle two;
The second pair at seven years;
At eight, the spot each "corner" clears.

From middle "nippers," upper jaw,
At nine the black spots will withdraw;
The second pair at ten are white;
Eleven finds the "corners" light.

As time goes on the horsemen know
The oval teeth three-sided grow;
They longer get, project before
Till twenty, when we know no more.



Do it now.

Spring is here—so says the calendar at least.

A clean shop, like a clean heart, tends to better all things.

Time flies. You must either hold the pace or be left behind.

System, said Thornton, when asked what his secret of success was.

One a thinker, the other a tinker—the difference between a good horseshoer and a poor one.

Don't get caught with a rush of spring work and find yourself unprepared to handle it. Successful craftsmen cultivate the habit of looking ahead.

There's a man over in Massachusetts who has invented a device for feeding chickens forcibly to fatten them for market. A cramming machine it is termed. What will come next?

Speaking about that slow paying customer whose bill is a year over due, it is a better plan to get your money and lose his friendship than retain his friendship and lose your money.

Good books make good companions. Get acquainted with some able writers on shop topics. You will not only enjoy their company, but find their conversation both interesting and valuable.

Neat work talks, both in getting and retaining custom. A little paint judiciously applied, often goes a long way towards satisfying a customer. Some smiths act as though it didn't pay to do too much.

The latest side line coming to our notice is a livery in connection with a smith shop. This chance for more money many of our readers can grasp. What is your opinion or experience regarding side-lines?

Many handy kinks you have undoubt-

edly come across during your years of experience. Write them out and send them in, so that your brothers of the AMERICAN BLACKSMITH family may benefit by them.

What's in a name? Quite a little when it comes to buying tools and machinery. Insist on getting the brand you ask for and don't take the just-as-good kind. Look for the trade-mark, look for the name, every time.

No time to lose in getting started with an organization in your county. Many craftsmen are writing in for the plans we send free to any smith who wants to put up prices in his neighborhood. Shall we send them to you?

Got an engine? If so, why not write up and send in a little story on "before and after using?" Most craftsmen agree in saying, "once a user always a user." What has been your experience with power in the shop, gas, steam, wind, water, electricity or animal power?

Pay no bills for goods until you have checked up to see if they have been received as ordered and in good condition and if the price is figured correctly. Freight bills also are no exception to this rule, for errors are just as apt to be made on them as on any other bills.

His neighbor's prices little worry the smith with skill and backbone. When a patron says "Jones over yonder will do that job for so much, which is cheaper than your price," he does not hesitate to tell the kicker to go to Jones if he wants Jones' work, adding, "If you want my work, you will have to pay my price. The job cannot be done right for any less than I ask."

Greatly gratified are the publishers of this journal for the many kind letters that are coming from readers, stating how very much they prize the paper. So many are being received, in fact, that it is almost impossible to reply to each one individually so that we must here extend thanks for these numerous expressions of approval. It is a source of extreme pleasure and satisfaction to learn that readers appreciate our efforts to give them the best and most helpful reading matter that can be had.

"A full measure of business success is impossible to the craftsman not taking a paper devoted to his trade. Of course, I mean a live journal, one that prints good, practical stuff, and that has the interests of its readers at heart above all else. There is nothing equal to a good trade paper for keeping a man up-to-date in all things relating to his craft." Such were the words of an old retired smith, whose past labors at the anvil now enable him to live with ease and comfort in a pretty home of his own.

The purpose of this paragraph is to state that one of the biggest blunders any blacksmith can make is to turn a job away because his shop is too full of work. More vital than the temporary loss of revenue is the chance that the customer may go to a shop he will like better. Rather plan ahead to take care of every need of every customer. Work as much overtime as may be necessary, and do your resting after the rush is over.

The electrification of various portions of the New York Central railroad is proceeding according to definitely laid out plans, being well beyond the experimental stage. The new electric locomotives which

are being tested have a maximum horse power of 3000, as against less than 2000 horse power for the latest and most powerful steam express locomotives, in spite of the fact that the former weigh little more than half the latter.

Consistency is a jewel, but persistency is a whole treasure casket full of them. A stick-to-it, never-say-die spirit is the greatest factor for winning success, whether it be in the smallest shop or the mightiest enterprise. If more craftsmen were inspired with this feeling, there would be fewer blacksmiths quitting the business and more of them making a great success of it. It often happens that he who gives up one trade for another is soon ready to quit that one also, and so on.

A certain smith we know of has lost no less than three customers during the past week by not having jobs finished when promised. One man wanted an axle mended, needing the vehicle badly. Our friend the smith made three successive promises, and lived up to none. Most craftsmen do those jobs first which are in the greatest rush, but on questioning Tom—yes, it is our friend Tom of whom we speak—we learned that his method was to take the easiest work first always and put off the hard jobs to the end or as long as he possibly could.

Just a minute of your time is what we are asking of you. We want you to get just one new subscriber to this paper, to your paper, in other words. When next you meet a brother craftsman, ask him if he takes THE AMERICAN BLACKSMITH. If he doesn't, then tell him how valuable and interesting the paper is to you, and induce him to let you send in his order for the paper regularly at a dollar a year. This will not take much more than a minute of your time. And a double advantage it is for you to do this. The more readers we get the better can we make the paper. For each new reader you secure we extend your own subscription six months free. Hundreds and hundreds of readers have taken advantage of this very liberal offer. But have you? Then why not do so? We make a strong personal request that you send at least one subscriber during April.

From far-away Australia a reader sends the following extravagant little news item:

A Servian peasant and a Magyar miller got into an argument about the warlike qualities of the Japanese and Russians. The peasant maintained that the Russians were the better soldiers, while the miller gave the palm to the Japs. As neither would yield to the other, they decided upon a test. The Magyar, a blacksmith, placed the handles of a three-foot pair of tongs in the fire until they got red hot.

"Now take the tongs at the proper end and squeeze my neck with them. If I cry out the first three minutes I am a coward."

Much to the Magyar's surprise, the Servian grabbed the tongs with both naked hands. He took the Magyar's neck between the two cold steels and squeezed it as if determined to break the bones. Of course, the Magyar howled with pain, but it took the combined efforts of half a dozen men to force the Servian to let go of his victim. The Magyar may die. The Servian will be unable to ever use his hands again, for they were burnt to the bone.

American Association of Blacksmiths and Horseshoers.

Gradually the smiths of this country are awakening to the fact that they are not acquainted with their fellow workmen as they should be. The members of other trades have for years past been interested in beneficial organizations and have found the resulting advantages of such societies to be invaluable in retaining the respect which their work deserved. This state of affairs is gradually dawning upon the minds of the blacksmiths of this country and every day they are coming in closer contact with one another.

With the opening of spring and with promises for good roads we find many blacksmith organizations in formation.

The Blacksmiths' and Woodworkers' Protective Association of North Missouri.

The above named association, which was recently formed at Fayette, Missouri, promises to develop into a very strong organization. Shortly after the first meeting, an exceedingly complete set of by-laws were drawn up and printed in pamphlet form, containing many interesting regulations. Surely the smiths of this vicinity have developed that spirit of brotherhood which should more frequently exist between the different members of the craft. The object of this Association states most emphatically that it has been founded for the sole purpose of advancing the interest of the blacksmithing craft—for the general good and welfare of the trade, each member lending his conscientious support to that end. One of the interesting articles in the set of by-laws is that relating to fees for members:

1. Member running three fires shall pay a fee of five dollars.
2. Member running two fires shall pay a fee of three dollars.
3. Member running one fire shall pay a fee of two dollars.
4. Member running small shop in country shall pay a fee of one dollar.
5. Woodworkers running an independent shop shall pay a fee of one dollar.

6. The levy of assessments shall be fifty per cent. of membership fees.

The spirit in which this article was adopted shows that the association is desirous of admitting all smiths who have the interest of the craft at heart and wishes to treat each man with equal justice.

Below will be found an extract from the price list adopted by the Association for governing its charges:

Shoeing.		
4 New Shoes	.....	\$ 3.00
4 Old Shoes	.....	2.00
4 Plain Shoes (2 shoes 65c)	.....	1.25
4 Toed Shoes	.....	1.50
2 Shoes, toe weights	.....	1.50
2 Shoes, side weights	.....	1.50
2 New Bar Shoes	.....	1.50
4 Plain Shoes reset	.....	.80
4 Toed Shoes reset and sharpened	.....	1.00
4 Old Shoes toed	.....	1.20
2 Rubber Pads	.....	3.00
Plow Work.		
Diamond Plow Point	.....	2.00
Slip Shares	.....	2.75 to 3.50
Mould Boards	.....	3.00 to 4.00
Steel Beam	.....	2.50
Steel Beam, set	.....	.75
Patching Mould Boards	.....	.75 to 1.00
Double End Cutter with clamp	.....	1.50
Clamp only	.....	.50
Short End Cutter	.....	.75
Heel on Bar	.....	.75
Pointing Diamond Plow	.....	.50
Pointing Plows	.....	.75
Diamond Plow, sharpened	.....	.10
Sharpening Plows	.....	.20 to .35
Three-horse Plow Beam	.....	2.00
Two-horse Plow Beam	.....	1.75
One-horse Plow Beam	.....	1.25
Plow Handles, each	.....	.50
Plow Rounds, each	.....	.10
Sharpening Road Grader Blades	.....	3.50
New Road Grader Blades, per foot	.....	1.50
Wagon Work.		
1 pair of Common Rub Irons	.....	.50
1 pair of Patent Rub Irons	.....	1.00
Ironing Wagon Box, bottom and top	.....	4.00
1 pair Wagon Double Tree Plates	.....	.25
Ironing Wagon Bolsters, new iron	.....	1.25
Ironing Wagon Bolsters, old iron	.....	.50
Bolster Plate, new	.....	.50
1 New Hound Brace	.....	.40
Circle Iron	.....	.50 to 1.25
Prop Nuts	.....	.15 to .25
Shifting Rail	.....	2.00
Whip Socket	.....	.25 to .35
1 New Bow Brace	.....	.35
Top Prop Post	.....	.50
Stay Chains, per pair	.....	.50 to .75
1 Tripod	.....	1.50
Iron Work.		
1 set Cultivator Shovels, pointed	.....	2.00
1 set Cultivator Shovels, sharpened	.....	.40
1 set of Disc Cultivator Shovels, sharpened	.....	1.50
1 Disc Harrow Plate, sharpened	.....	.25
Sharpening Churn Drill	.....	.20
Sharpening Stone Hammer	.....	.15
Sharpening Pick	.....	.15
Sharpening one set of Grainmill teeth	.....	.50
Sharpening one set of three Coal Miners' Drills	.....	.60
Spoke in Iron Wheel	.....	.50
1 Wagon King Bolt	.....	.50
1 Wagon Wrench	.....	.35
1 Hammer Strap	.....	.35
Shackle Clips, each	.....	.65
Welding Shaft Iron	.....	.50
Buggy Pole Brace, each	.....	.35
Pittman Rod, welded	.....	.50
Welding Sickle	.....	.75
Wood and Iron Work.		
To put Buggy or Surrey on narrow track	.....	4.50
To put Buggy or Surrey to wide track (old caps)	.....	5.00
To put Buggy or Surrey to wide track	.....	6.50
Cutting down wide track on farm wagon	.....	4.50
1 Wagon Tongue Complete	.....	4.50
Running Gear Brake	.....	5.00
Brake Ratchet	.....	1.00
Hound Plates, cast	.....	1.00
King Bolt	.....	.50
Tongue Rod	.....	.40
Tongue Cap	.....	.50
4 wheels spoked and rimmed for 1½ inch tires	.....	13.00
4 wheels spoked and rimmed for 1½ to 2 inch tires	.....	16.00
Spoking and rimming 1 hind wheel	.....	4.00
Spoking and rimming 1 front wheel	.....	3.50
Spoking 1 hind wheel	.....	2.50
Spoking 1 front wheel	.....	2.25
Rimming 1 hind wheel	.....	1.75
Rimming 1 front wheel	.....	1.50
1 Hub	.....	1.00
1 Spoke	.....	.25
1 Fellow	.....	.30
Cutting down 4 wagon wheels	.....	8.00
Cutting down wide track wagon	.....	4.50
Buggy Spring Bar	.....	1.00
Surrey or Spring Wagon bar	.....	1.25
Straight Buggy Reach	.....	.75
Straight Surrey or Spring Wagon Reach	.....	1.00
Double Bent Reach	.....	1.00
Buggy Neck Yoke	.....	.50
Front Bow in Buggy Top	.....	1.25
Back Bow in Buggy Top	.....	1.50
Center Bow in Buggy Top	.....	1.75
Bow Sockets	.....	.75
Spoking and rimming one buggy wheel	.....	3.50
Spoking buggy wheel	.....	2.50
Rimming buggy wheel	.....	1.50
One-half rim	.....	.75
Rimming 4 buggy wheels	.....	5.00
1 Buggy spoke	.....	.25
1 New Buggy Shaft	.....	1.50
1 New Buggy Shaft, D. B.	.....	1.75
1 New Cross Bar	.....	.75
Buggy Singletrees, each	.....	.50
Buggy Doubletrees, each	.....	.75
New Buggy Doubletrees complete	.....	2.50
Pole Circle	.....	.75
Buggy Pole (pole only)	.....	2.25
New Axle Bed	.....	1.25
New Side Bar, medium	.....	1.50
New Side Bar, large	.....	2.00
Front Hound's, square, each	.....	.75
Hind Hounds, each	.....	.75
Tongue Hounds, each	.....	.75
Bottom Slider	.....	.75
Top Slider	.....	.35
Front Bolster	.....	1.50
Hind Bolster	.....	1.50
Sand Bolster	.....	1.50
Standards, per set	.....	.50
Wagon Doubletree	.....	.75
Plow Doubletree	.....	.50
Wagon Neck Yoke, medium	.....	.50
Wagon Neck Yoke, long	.....	.65
Wagon Singletrees, each	.....	.35
Plow Singletrees, each	.....	.25

The Lien Law Movement.

Among others the smiths of Connecticut, Nebraska, New York and South Dakota are working conscientiously to get a lien law bill passed at the present session by their respective State legislatures. These wide-awake craftsmen have sent signed petitions to their representatives, have sent committees to confer with the legislators and have written many personal letters to their brother smiths urging their hearty co-operation.

The Washington Lien Law Bill.

We are much gratified to be able to report that our campaign and agitation for Lien Law has been attended with quick success in one state. Word has just come that the blacksmiths' Lien Law has gone through the Washington Legislature, so that the smiths of that state should soon be enjoying the pro-

tection which that law will afford them. We congratulate the craft of that state upon this happy result. Many thanks are due the progressive smiths who helped bring it about.

The Connecticut Lien Law Bill.

Recently the progressive smiths of Norwich, Conn., elected a committee to confer with the State legislators at Hartford. These men will journey to the capital and attempt to stir up an interest in the lien law movement there, but they of course need the support of every up-to-date smith in the State if they are to succeed in this undertaking. Several of the State legislators have already promised to vote for the bill, and the committee is now working earnestly for its passage. The leaders feel very confident, and claim that they will get the bill through if their brother smiths stand by them.

The Nebraska Lien Law Bill.

In Nebraska, the blacksmiths are anxiously waiting for the lien law bill to come to a vote. Some time ago the bill was introduced and placed in the hands of a committee, but as yet has not been reported. In the meantime, the smiths have been using every effort to arouse a general feeling in favor of the proposed law and have corresponded to no little extent with the State legislators, several of whom not only heartily endorse the movement but promise to use their influence in getting the bill passed.

The New York State Lien Law Bill.

Probably in no other State of the union have the blacksmiths joined hands with such enthusiasm over this movement as the smiths of the Empire State. Considerable correspondence has been carried on regarding it and every member of the craft seems to have interested himself in the new law. The bill was introduced some time ago in both Senate and Assembly, but up to the present time has not been put to a vote. This, however, should not discourage the smiths, for the process of law-making is a slow one and inasmuch as we have the support of so many influential men, the prospects are very bright in our favor. Hon. Robt. Lynn Cox and Hon. George A. Davis are both using every effort in behalf of the bill and believe that it will go through. Many other State legislators are working for it and at the present time there seems to be very little reason to fear its rejection.

The South Dakota Lien Law Bill.

The lien law bill has been introduced in the South Dakota State legislature and the blacksmiths of that State are

urged to co-operate in securing its passage. Personal letters to your Representatives asking their support are invaluable. They should be willing in every case to do their best for a bill to which there can be no direct opposition and in which we find embodied principles for the general good and welfare of the State. The protection of the honest craftsmen against the unscrupulous practices of the "dead beat" is all that is asked. Write to your Representative today; don't wait till the present session is over.

A Home-Made Air Hammer.

W. J. SHRA.

The accompanying engraving shows an air hammer which was made for



A HOME-MADE AIR HAMMER FOR STRAIGHTENING SCRAP RODS.

straightening round and flat iron at the scrap pile. It will straighten all round stuff up to $1\frac{1}{4}$ inches in diameter. The hammer is made of an 8-inch brake cylinder. The anvil is a cast iron block. The upright frame is an old mortising machine which was thrown out on the scrap pile from the car shop. The hammer is operated by a foot treadle connected to the valve on the top of the cylinder by a rod. This leaves both hands of the operator free to handle the rods to be straightened. The frame of this hammer could be made of old channel irons, or even a wooden post would do.

We are now using this air hammer at the Illinois Central Railroad Company's shops at McComb,

Mississippi. It is especially useful as we have a great many scrap rods to straighten.

The Gas Engine.—7.

E. W. LONGANECKER.

Gas Engine Manipulation.

This subject suggests the handling of a gas engine to the best advantage. Getting the most out of it with the least trouble, and expense. Making it our ready servant instead of becoming a slave to it. All this sounds very well and I doubt not that some of our readers are already casting their eyes below with the hope of catching a glimpse of some "short cut" rules to manipulation. The shortest cut that I have ever found to successful manipulation of anything is actual love for the work in hand. Deep interest in the machine to be handled. So long as one manipulates a gas engine "because he has to" results will not be encouraging. The engine will not be an ever ready and willing servant. The manipulation will not be a "howling" success. The engine will be manipulating the mind of the manipulator or possibly through him the mind of his employer. But inasmuch as the majority of blacksmiths are their own engineers, unsuccessful manipulation cannot be blamed onto employees. Considerable foresight is necessary. Anticipation of the wants and needs of the engine. Liberal and timely provision of fuel, battery, water, and oil supplies. Close observation from the beginning, with ear, eye, nose and touch. Locate early the parts of the engine that are most likely to wear then give them constant and regular attention. The igniter points making the electrical contact are very delicate parts of an engine and are quite perishable by reason of the heavy duty they have to perform. The proper manipulation of these points is a long step toward the successful manipulation of the entire engine. A few minutes' attention to them daily will soon reward one with a full understanding of their requirements at a glance. The source of the electric current whether battery or dynamo must have its full share of attention. If a battery, the switch must be shifted so as to cut out the current immediately after the fuel is shut off from the engine so as to avoid a short circuit and battery consumption while the engine is not in use. Third, batteries to do their best should be kept well filled with solution. The wrist and crank shaft boxes should be felt or frequently to see if they are running cool. The ear plays an important part

in the successful handling of an engine. With a little direction it will quickly master the natural sounds of the engine. It will lead one to know what parts make the natural sounds and why they are made. It will be ready to detect unnatural sounds the instant they occur. The unnatural sound signifies something wrong. The eye will then be able to locate the cause of the trouble. The best service can be gotten out of a

There is quite a knack in manipulating the fuel and fly wheels in starting the gas engine. If it is possible to let a charge of gasoline into the mixer before turning the wheel it is well to do so, provided too much is not let-in. Then a brisk and steady forward movement of the fly-wheel is necessary for one and one-half turn. I have often noticed persons push on the spoke of the wheel till the compression point

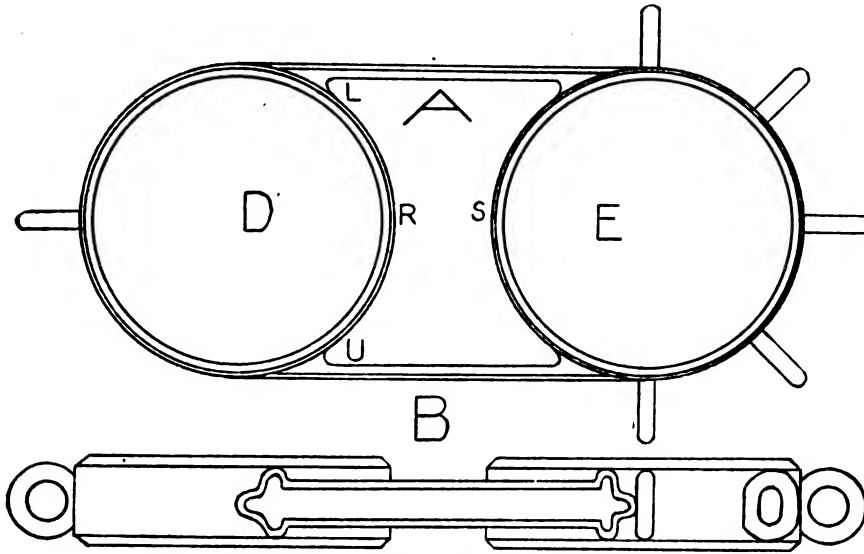


Fig. 1.—SHOWING A TOP AND A SIDE VIEW OF FINISHED BAND.

gas engine by giving it an easy load. Heavy loads cause regular successive and full explosions, overheating the valves and often the interior of the cylinder. This same overload taxes the wrist and crosshead boxes to their utmost and often starts them to heating and cutting. A load that is well within the capacity of the engine will be handled all day with apparent enjoyment to the engine.

Here the judgment of the shrewd operator will make a successful hit in manipulation. He will carefully moderate the load and by continuous application will turn out more and better work than by overload. Where a hit and miss governor engine is used the writer always likes to see the governor cut out one charge after two or three successive impulses. This gives the engine a little breathing chance. Where an engine is installed for stationary work we think it is poor policy to belt the engine direct to machinery. A line shaft should be used and all machines driven from it and the engine driving this shaft. Tight and loose pulleys or a friction clutch pulley should be put on the line shaft to be belted to from the engine. This arrangement allows starting of the engine without the line shaft and machinery.

was reached then take their hands off, just at the vital point when they should have pushed harder. One should learn which the compression movement is and when he once lays hand on for the purpose of turning keep up a constant shove until over the first or second compression.

(To be continued.)

Construction of a Mast-head Band.

C. R. RICHARDSON.

Bands such as these are used to connect wooden spars to increase their height. The band marked E is fitted on the mast-head and the top-mast is shoved up through D, this spar being tapered from the top end to about three feet of lower end. The parallel space allows the spar to jam in the band, leaving the remainder to fasten to the lower-mast by means of a nicely finished block of wood called a step. This is placed under the heel of the topmast and fastened with through bolts. About six inches from the lower end of the spar a slot is cut through the stick. In this is placed a sheave. This is used to raise and lower the spar. A line is fastened to one of the eyes on the cap band, run through the sheave, then through a snatch block and down to the deck to the winch or capstan.

The band we are to consider is to be forged out of Norway iron, and there are to be no welds in the side arm that connects the two bands. It can readily be seen that it would be useless to try to weld at R S for it would be impossible to smooth or chamfer this part properly, so we will necessarily have to consider another plan.

First make a full size drawing on a sheet iron plate so the work can be placed upon it hot. Then figure the circumference of the bands. Next measure the length of the side arms, and then with the dividers spread very little, measure the distance from U to L Fig. 1, and space off the distance for this length. Having all the sizes and lengths, lay them off on the length rod, marking it as shown in Fig. 3.

Now heat the bar at G and bevel with a tool made like the cutter used when cutting hot iron. At A and B round with fuller, leaving a big fillet. Next draw and chamfer the distance between A and C and B and D and so on throughout the whole length. It requires no allowance for drawing. Now bend the arches X and Y. Then bend the sides in place as the dotted lines show. Now heat the end Z and weld. Then with a small gouge clean out the fillet and finish. Work the remaining three ends in the same manner. The middle of the cap will look like Fig. 4 without the eyes on it. These eyes S and T should be worked out before welding the band on as it would be inconvenient to do this after the eyes were jumped on.

To obtain the best results when heating any work on its edge, is to place it in the fire and cover the part to be heated with short pieces of dry wood. Over this put a good thick shell. The

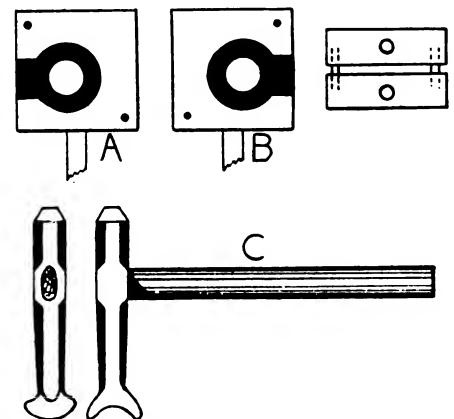


Fig. 2.—TOOLS USED IN SHAPING BAND EYES.

object of this shell is that when the wood is burnt away the shell will form a space over the iron very near equal to the fire pot below. This space acts

as a combustion chamber, causing the heat to be equal all over the work. When properly heated place the end in the stamp block spoken of in the January AMERICAN BLACKSMITH. Use this plan on both eyes. The center

received, thanks to the man I was helping (he happened to be a negro), I would perhaps have drifted away to something else. Since that time I have made a study of human nature as well as the craft and having a desire to get ahead,

of is that a great many young men nowadays are attracted to some other trade because when they get a little start at it they can go all over the country working at one place a few days and then jumping to another,

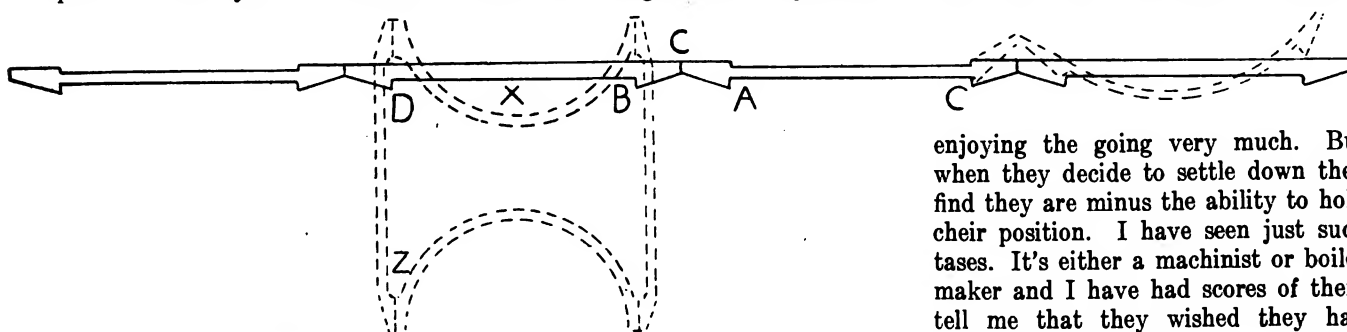


Fig. 3.—SHOWING METHOD OF FORGING THE SIDE ARMS AND HALF OF BANDS.

of the cap band is now finished. The end bands are to be made next. The eyes on these should be welded on the straight bar and worked out afterwards. These bands are made from stock cut to length upset at the ends and then bent as shown by dotted lines in Fig. 4, F. To hold the ends in place until welded, take a light heat on the edge and stick a piece of round iron across the lap. Do this on each edge. Then with a good body heat lay in pieces and finish off. The die A, B, Fig. 2 is used on the eyes after the hole has been punched. Place eye on A and then place B on top of the eye, now drive the parts together. The tool will leave the usual fin found on stamp forgings. Cut this off and replace the eye in the tool, adding a little oil this time. This will make a fine eye in two heats if properly worked. A hard tool as used when clearing the eyes is shown at C, Fig. 2. The advantage of this tool over the old style is that its length between the eye and face allows you to reverse the band without changing the tool from one hand to the other.

Why Do So Few Young Men Learn Blacksmithing?

F. H. W.

The question has often been asked; why do we not see more young men in the smith shop learning the trade? Perhaps there are a great many who can answer this question and there would perhaps be as many different answers. There are a great many reasons, however. The writer has his ideas on the subject and perhaps there are a great many who will agree with him. Although young in age it seems a long time since I first began as a helper in a small carriage shop in Indiana and had it not been for the encouragement I

I still find myself as anxious as ever to learn all I can.

I find blacksmithing, to a certain extent, is being abused. What I mean by abused is that a great many say that it isn't necessary to learn it, because machinery is taking our place and that there isn't enough pay in it. Again there are people who think it isn't anything to learn anyway. Let me say a word to the young smiths: When you make up your mind that you have got one of the best trades going, just that soon are you using good judgment. So far as machinery taking our place, the time will never come when a good honest, industrious and sober smith will not be in demand and at good wages. Only a few years ago as I was going from one place to another it came to my notice that railroad shops were all headed by old gray-haired foremen. I

enjoying the going very much. But when they decide to settle down they find they are minus the ability to hold their position. I have seen just such cases. It's either a machinist or boiler maker and I have had scores of them tell me that they wished they had learned the blacksmith trade. Regarding the shop, I think the foreman should encourage the young men under him. Get them to take an interest in their work. I have found by experience that it makes them feel better and makes better mechanics of them.

Equipping the Paint Shop.—1.
Partitions for Dividing the Shop—The Shop Runway—Arrangement for Light and Ventilation—Shop Tools—Labor-Saving Devices—Paints, Varnishes and Brushes Enumerated in Detail—Cost of Labor-Saving Devices, Tools, Stock, Etc., Etc.

M. C. HILLICK.

The paint shop, however small it may be, should be arranged into three rooms. If not so arranged provision should be made for dividing it into at least two rooms, and, preferably, three, as occasion will suggest. Many small shops have only the one room, in which all the operations incident to a jobbing trade are carried on, and for perhaps a larger share of the time this one room

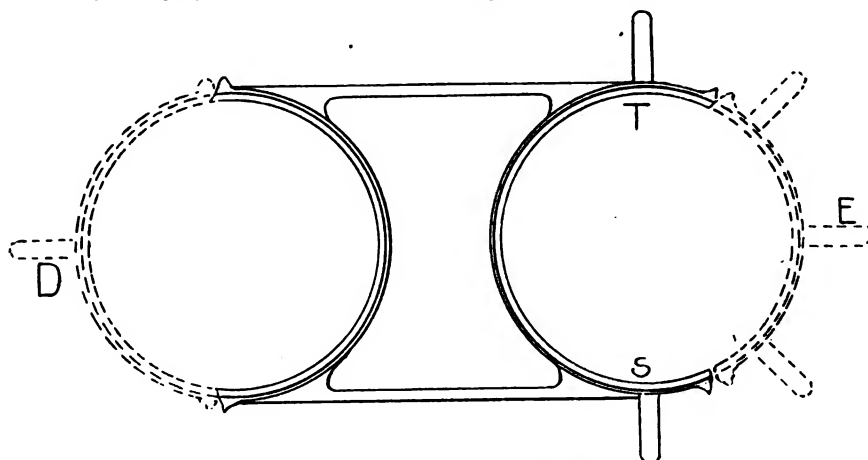


Fig. 4.—SHOWING METHOD OF FORGING THE BANDS AND EYES.

came to the conclusion that some time some one would be called upon to take their places. I decided to be one of the called upon. I am now on the first step and very anxious to see what there is ahead of me.

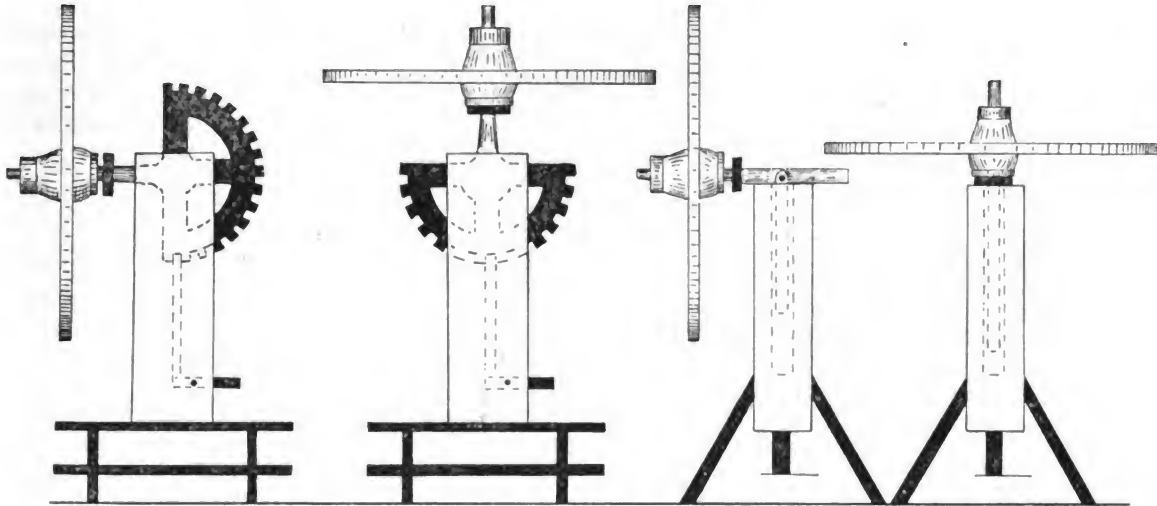
Another reason that I might speak

may meet requirements fairly well, but days come when both painting and varnishing must be carried on at the same time and to accomplish this it is necessary to have a second and third apartment. In case the shop cannot be permanently divided into the necessary

two or three rooms, make movable partitions, at nominal expense. These may be handled after the manner of stage scenery. Arrange to run these partitions in grooves at the top and bottom. For a medium sized shop provide six of these partitions. Make

In equipping the shop, if it be located on the second floor or above that, the question of getting work into the shop must be considered. The country paint shop can scarcely ever afford a modern elevator, and all things taken into account, the outside runway with a good

unhang and hang off work, there should be an assortment of S wrenches, of malleable iron, running in size from $\frac{1}{4}$ to 1 inch. Such wrenches may be bought of the carriage hardware dealer at about 10 cents per pound. Malleable axle wrenches $\frac{1}{4}$ to $1\frac{1}{2}$ inch will be needed.



Figs. 1 and 2.—SHOWING TWO CONVENIENT STYLES OF WHEEL JACKS.

the frames of one inch material, mortised and screwed fast at the corners, and cover with good unbleached muslin, sewing the breadths together and tacking them on the frames. Apply a coat of yellow ochre lightened up some with keg white lead and mixed to a working consistency in three-fourths raw linseed oil, one-eighth coach japan and one-eighth turpentine. This will prolong the life of the muslin and give a better color effect to work by. The six pieces of partition will furnish three rooms for the shop—a general painting room, a varnishing room for bodies, and one for running parts, or, as occasion requires, the latter room may be used as a set room, i. e., a room for freshly varnished

drying scaffold at the upper termination offers the most advantages, at small cost, of any that may be named. The drying scaffold will serve a number of useful purposes, chief among which is the washing of carriages, and under favorable weather conditions, the drying of them. If possible, locate the runway on the east side of the shop, thus affording better protection from the wind and from the afternoon sun. The water supply, of which there can scarcely be an excess, should be piped directly into the paint shop at a point where it is most used. Equip the shop with as much window space as possible; the more, the better. An excess of light is an unheard of thing in the paint shop. Light hastens the drying of paint and varnish and facilitates painting operations in general. Ventilation is another feature of paint shop equipment which should not be ignored. Ventilation simply *must* be had. The best style of ventilation is that reaching the shop through the roof. If this is impracticable adjust the windows so that they can be lowered from the top, as fresh air from this source is far better than none, and it may be obtained from over the windows with less disturbance to shop operations than through doors and under raised windows, the two latter sources of supply generally causing draughts of air at points where they will do the greatest damage. All windows should be equipped with roller curtains.

Shop Tools.

Considering first the tools needed to

Also a Hawkeye pipe wrench, a pair of bolt clippers, two small screw-drivers, one large screw-driver, a brace and several sizes of bits, a couple of blacksmith files, a couple of steel punches, cold chisels in three sizes, a pair of pincers, two hammers, a wagon jack,

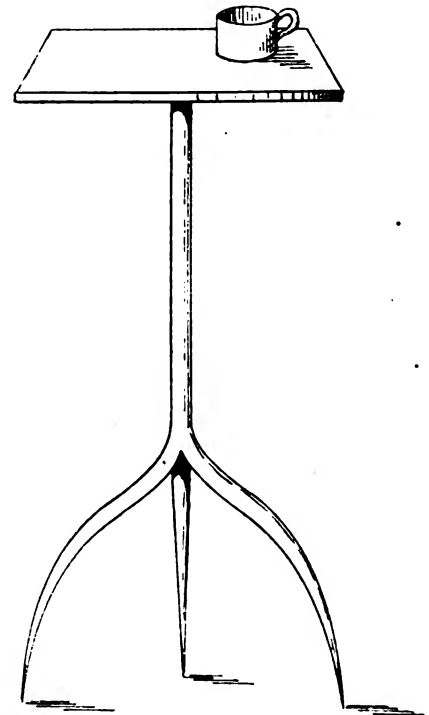


Fig. 4.—SHOWING A HANDY VARNISH STAND.

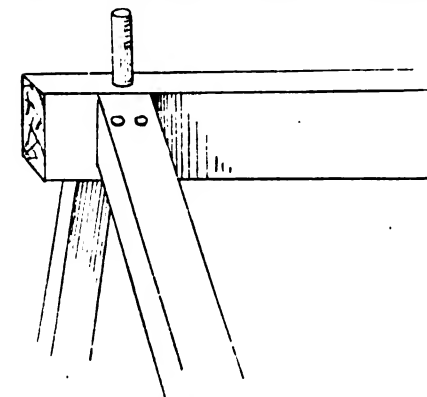


Fig. 3.—SHOWING A STYLE OF GEAR HORSE.

work to harden in. These partitions may be taken away and set against the wall of the shop in small compass when varnishing is not being done and when the one large room can be used to better advantage than the three small ones.

shaft couplers, and some other tools that will suggest themselves as business develops. Past issues of the AMERICAN BLACKSMITH, notably those of 1903, contain illustrations of a variety of labor-saving devices without which even the

small country paint shop cannot be made to pay its best measure of profit. Wheel jacks, gear and body trestles, etc., not expensive if shop-made, are surely indispensable. The small shop will need one revolving trestle for running parts, one for bodies, and it ought to have at least four wheel jacks.

Paints, Varnishes and Brushes.

Fix up the paint bench in a light corner of the shop. At one side of the

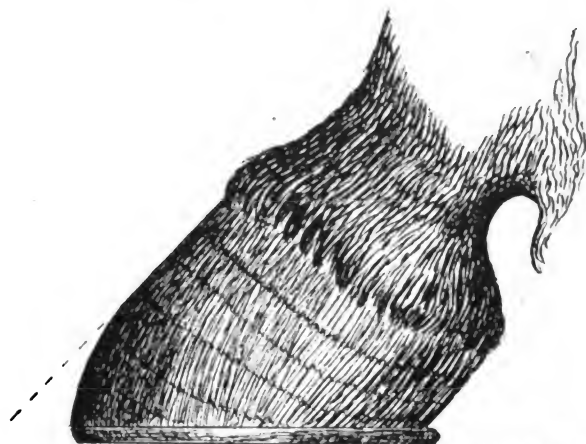


Fig. 1.—THE HOOF FITTED TO THE SHOE. DOTTED LINE SHOWS AMOUNT OF WALL RASPED AWAY.

bench locate an enclosed cupboard, also shop made, in which all the fine colors may be kept clean and in good order. On one corner of the paint bench place a hardwood slab 12 by 18 inches by 2 inches thick, on which to mix putty. Nail up in close proximity to this bench a couple of boards on which to wipe out paint brushes. This removes all excuse for defacing the walls of the shop. Two or three putty knives, a palette knife, and a French blazing knife will be a part of the cupboard furniture. Likewise a paint burner. Of brushes there will be needed, say:

One 3-inch flat duster. Six round dusters. Twelve round or oval bristle

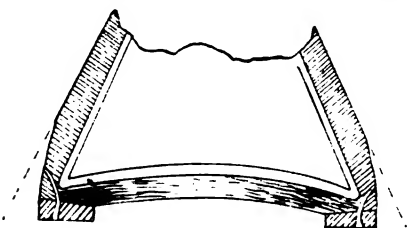


Fig. 2.—CROSS SECTION OF FOOT SHOWING NAILS DANGEROUSLY CLOSE TO SENSITISED TISSUES.

brushes. Twelve 1½-inch flat camel's hair brushes. Twelve 2-inch flat camel's hair brushes. Twelve 1½-inch flat badger hair brushes. Two sets of flat bristle varnish brushes for body work.

In varnishes start with:

One gallon high grade elastic body finishing. One gallon high grade elastic

gear finishing. Two gallons medium drying body finishing. Two gallons heavy gear finishing. Two gallons black rubbing varnish. Two gallons clean rubbing varnish. Two gallons coach japan.

In paints, furnish:

One 25-pound keg white lead, ground in oil. One 5-pound can coach black, ground in japan. One 5-pound wine color, medium shade. One pound

Brewster green. Two pounds ultramarine blue, medium shade. One pound chrome green, ground in japan. One pound Quaker green, ground in japan. One pound 20th Century green, ground in japan. One pound chrome yellow, ground in japan. One pound orange chrome, ground in japan. One pound canary yellow, ground in japan. Two pounds English vermilion, ground in japan. Two pounds Indian red, ground in japan. Two pounds Tuscan red, ground in japan. One pound burnt amber, ground in japan. One pound burnt sienna, ground in japan. One pound raw sienna, ground in japan. Five pounds of some of the popular reds. Five pounds of different shades of lake color.

The reds and lakes to be selected with especial reference to the shades of these pigments most popular in the country in which you are located.

Of dry pigments there will be needed as follows:

One pound lamp black. Five pounds Venetian red. Two pounds Indian red. Ten pounds white lead. Two pounds gilder's whiting. Approximate cost of equipping the shop:

Tools and labor-saving devices,	
exclusive of brushes.....	\$ 30.00
Brushes	25.00
Varnish and japan	55.00
Pigments and colors.....	40.00

Total\$150.00

(To be continued.)

Fitting the Shoe to the Hoof versus the Hoof to the Shoe.

E. W. PERRIN.

The fitting of the shoe to the hoof is one of the most important operations of shoeing a horse, but notwithstanding all that has been written about this phase of the subject it is very common today to see the wall of the hoof rasped

away to fit the shoe. There are more horses lamed in shoeing as a result of fitting the hoof to the shoe than in any other way. It is a common practice today in 60 per cent. of the shoeing shops to fit the shoe more or less close, then rasp away the wall to fit the shoe. It is urged that it does not matter about taking off a little of the wall with the rasp, but the trouble is in the repetition of the practice at every shoeing. The wall of the hoof of a medium sized horse

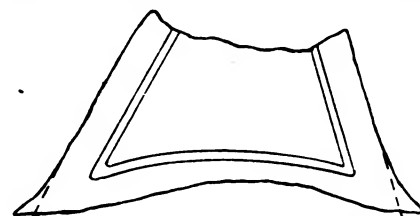


Fig. 3.—CROSS SECTION SHOWING FOOT "WINGY" ON THE SIDES.

is about a half inch thick; it takes from nine to twelve months to grow a hoof from coronet to ground surface, hence if you reduce the thickness of the wall at each shoeing $\frac{1}{8}$ of an inch, in six shoeings (the horse being shod once a month) the wall would be reduced in thickness by $\frac{3}{4}$ of an inch, thus leaving but $\frac{1}{8}$ of an inch that could be safely nailed to. See Fig. 1. With the wall so thin, it is all but impossible to drive a nail without pricking or pressing the sensitive laminae. But this is not the only injury which results from rasping the outside of the wall. For we remove the toughest portion of the hoof, and thereby expose the soft horn to the atmosphere, which dries it out. This is one of the most prolific causes of brittle hoof.

There is no excuse for rasping the outside of the hoof, except in a few cases where it may be necessary to

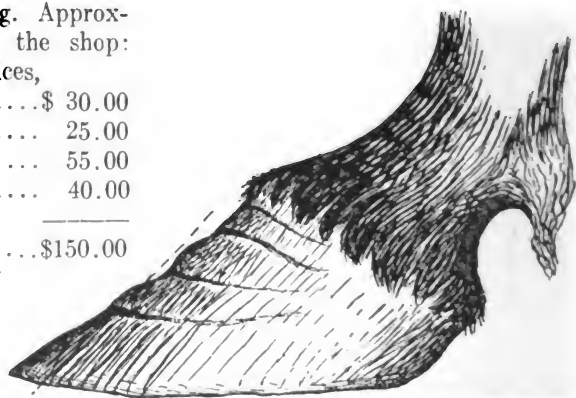
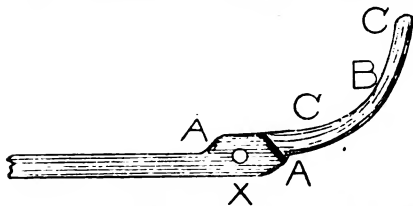


Fig. 4.—THE LAMINATED FOOT. DOTTED LINE SHOWS PART TO BE RASPED AWAY.

remove a "wingy" portion of the wall, see Figs. 3 and 4. But wherever this is necessary, the proper time to do it is in preparing the hoof for the shoe, and when once the hoof is reduced to its

normal dimensions the shoe should be fitted accurately to the outline of the hoof. Some shoers imagine they have done an extra smooth job when they have rasped the wall up to the coronet, smooth, it may be, but in this smoothing process they have taken away the best part of the wall, which nature cannot replace in six months. Observe a colt fresh from the pasture; there is a glossy smoothness on the outer wall, and the hoof is tough and strong, but the application of the rasp destroys this surface and exposes the horn tubes to the air, and every time you rasp the outer wall you reduce its thickness; you are rasping away what you will require to nail to at subsequent shoeings. When you



A PAIR OF TONGS FOR HOLDING PLOW SHARES.

examine a foot that has been pricked in shoeing, you will invariably find that the wall is so thin that it will be very difficult to drive a nail with sufficient hold to secure the shoe and at the same time not prick the foot. See Fig. 2. A "botch" workman can fit the hoof to the shoe, but it takes a mechanic to fit the shoe to the hoof. Try to be a mechanic; it may take a little longer, an extra trip to the anvil, but workmanship pays, while pricked horses lose trade.

How To Make a Pair of Tongs For Holding Plow Shares.

J. A. LOWRY.

It will be necessary to give a description of but one piece, as the other is only half of a common pair of tongs. Take a piece of stock large enough to forge out the entire piece or you may make a common straight tong and weld the crooked lip or jaw on to it. To make them solid, procure a piece of stock $\frac{3}{4}$ inches square; an old buggy axle is good. Mark it say three inches from the end and forge as if you were making a common straight-lipped tong, allowing the end B to spread or flatten out. Now finish the shoulders and weld on the handle. Then take the hot cleaver, split the end between the points C C and open about one-half inch or so it will go over a plow bar, then bend as shown in engraving. When you have finished this, forge another piece as though you were making a pair of straight-jawed tongs and rivet this to X. You will be surprised how firmly these tongs hold. When you

have finished the forging and have riveted the parts together, heat them good all over, procure an old point or a new one just as near the size of the point you have to make and fit your tongs to it. These tongs are for shares that are welded from the point only.



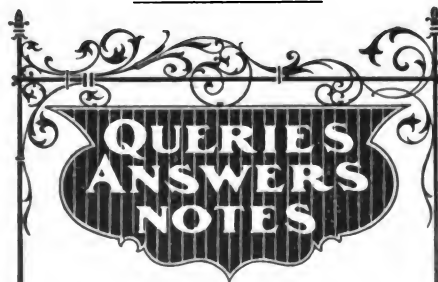
Here will be found brief anvil jotting, hints from far and near, shop methods seen or suggested.

A Kentucky smith sends in the following good receipt for welding compound: One pound of powdered borax, two ounces of black oxide of manganese, two ounces of carbonate of iron, two ounces of muriate of ammonia.

"I usually place a drop or two on a piece of clean white paper and expose it to the air. If there is no trace left you will know it is pure; if the paper is greasy you will know that it contains oil or other foreign matter that should not be in it." Thus answered a retired painter when asked how he tested turpentine.

A Southern friend sends in the following for finding the required length of a belt to run over pulleys of a given size: Add the diameters of the pulleys together, divide the result by two and multiply by three and one-seventh. Now add the product to twice the distance between the centers of the shafts and the result will be the length of the required belt.

The boss does not believe in having the boys sit around with folded arms when the work is slack. There are not many moments of this kind, but at such times he has the men work putting up new jobs. A good wagon carefully made by hand can be sold to a discriminating customer at a price high enough above factory work to ensure a good profit. Though the boss does not have an order for the vehicle when he starts, it is generally spoken for long before completed.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Tempering Brass Springs.—Will some brother smith give me a process for tempering brass springs? W. A. MAYFIELD.

Sharpening Toe Calks.—In answer to Bert. Cooper's query as to the best way to sharpen toe calks, would suggest that he hire a good man. JESSA LEWIS.

Tools for Putting on Rubber Tires.—Will some brother smith tell me of the best tools for putting on rubber tires? Also where to get the same? B. O. CRAWFORD.

How to Soften Steel.—In regard to Carl Leichner's query how to soften cast steel, would say use camphor-gum and turpentine when drilling. This combination is to be used instead of oil. CARL BEREUTER.

How to Soften Cast Steel to Drill it.—In answer to Carl Leichner's query about how to soften cast steel to drill it, will say, heat to a cherry red, then bury in slack lime over night or until cool. W. T. WALSH.

That Runaway Engine.—In answer to A. E. Thornton about the runaway engine, will say, the remedy for it is to take out the governor, clean it well and replace it. Use nothing but the very best oil in lubricating it. AUG. PERRES.

Who Sells Gunsmiths' Material?—I would like to know if any brother smith can tell me where I can purchase gunsmiths' material? I would prefer to buy from gun material jobbers only. AM. ASS'N. SMITH.

Wiring Old Rubber Tires.—Will some brother smith tell me how to put new wires in old rubber tires? I set a great many old rubber tires and find it very hard to remove the old wire and replace it properly with new stock. W. V. NUSBAUM.

Handling a Poor Paying Customer.—In answer to Brother G. P. K., will say that if he had a few statements like mine and sent them out every month perhaps those poor customers of his would get ashamed and pay up. W. T. WALSH.

The Runaway Engine.—In answer to A. E. Thornton regarding the runaway engine, will say there must be something the matter with his governors. I got the governors on my engine too tight, some time ago and it ran about five hundred revolutions per minute until I fixed them. C. E. BECK.

A Runaway Engine.—In regard to Mr. A. E. Thornton's runaway engine would say that the trouble is with the governors. They must stick somewhere, for when the governors work all right the engine will take the same amount of oil each time and run steadily, or if he has a sparker, and it does not work right, this will cause the same trouble. CARL BEREUTER.

Repairing Sarven Wheels.—Cut and punch out the rivets, and drive the spokes in glue. Take a $\frac{3}{4}$ or one-inch bolt long enough to reach through the hub, put a washer on each end of hub and tighten bolt as much as possible. Put on the rim and set the tire, rivet the hub and last of all, take out the bolt. If this is done properly you will have as good a job as can be done. C. E. BECK.

A Letter from Iowa.—I notice Adam T. Wible, in the February AMERICAN BLACKSMITH, says he has been without a helper since the first of December and his record for one day is 85 horses. Will Mr. Wible please tell us how many he would shoe if he had a helper? He should come to this country; his wages would be at least \$15.00 per day. We need such men as he is very badly. H. J. MURPHY.

Method of Removing a Broken Axe Handle.—If the handle cannot be knocked out any other way, bore a hole $\frac{3}{4}$ or $\frac{1}{2}$ -inch through the center of the wood which remains in the eye. Then heat a $\frac{3}{4}$ -inch poker or pointed piece of iron and burn out the remaining strip of wood from the hole. It may then be knocked out with an eye wedge very easily. W. H. NORRIS.

How to Temper a Square Punch Die.—In answer to Brother Short's query how to temper a square punch die, will say, heat the punch until you have about a cherry heat

all over it, then drop it into luke warm water. After it has cooled, polish it with emery paper. Now heat a piece of iron, set punch on end of it and draw the temper until it comes to a sky blue, then cool off entirely.
W. T. WALSH.

How to Shoe a Stifled Horse.—Take any old shoe that will fit the foot, then take a piece of half round iron and bend it V-shaped, flatten the ends of the V a little, so they will rest on the shoe $2\frac{1}{2}$ or 3 inches. Then weld on to the shoe, between the third and fourth nail holes. Now take a straight piece, weld one end to the toe and the other end to the V. This shoe should stay on about ten days.
W. A. P.

Trouble with Borrowers.—How can I keep the whole city from borrowing my tools? I have put up signs, but they do no good and I do not like to refuse certain parties. Does anyone know of a way to keep them from asking? I have even been asked to loan both of my anvils. The worst of it is they never return the things. If some brother craftsman will answer the above I will be greatly obliged. Will some brother help me?
J. F. SCHURLE.

A Runaway Engine.—In answer to Mr. E. A. Thornton regarding his runaway engine, doubtless his trouble is with the governors failing to hold exhaust valve open when they should, thus causing an intake of gas often than is required for the load. Too much oil causes them to gum and not sufficient oil would let them get dry. Use plenty of kerosene on the governors and the device which operates the exhaust to insure their proper working.
W. A. MAYFIELD.

Amount of Stock for a Ring.—Please let me know through the columns of your paper how long a piece of iron it will take to make a ring 5 inches outside diameter of $\frac{3}{4}$ by 5-inch iron. I tried to calculate it, but always cut my stock too short.
JOHN PADBERG.

In answer will say that the amount of stock required for a ring 5 inches in diameter is 1 foot 3 $\frac{1}{2}$ -inches.
W. B.

The Best Disc Sharpener.—In answer to August Perres, will say that I think Show Bros., of Newton, Iowa, make the best disc sharpener. I have used one for four years and it has given the best of satisfaction. This machine is speedy, does the very finest of work, is easy to operate and never gets out of order. It does not grind nor cut the disc away, but rolls it out and makes it larger, longer, thinner, sharper, harder and just as fine as silk.
J. H. SKEELS.

A Mare that Walks on Her Toes.—In answer to Brother A. W. Crigler, about the mare that walks on her toes, will say that if she is young she can be cured, but if she is old it will be difficult to help her. First take a shoe and weld a piece of steel to the toes. Then turn it up so it will not stick in the ground when the animal is in motion. The strip on the toe wants to be about 2 $\frac{1}{2}$ inches long, turned up like a slide runner.
J. B. ARNOLD.

An Interesting Item from South Dakota.—I think the paper is fine for the trade. I am at present installing a 4 $\frac{1}{2}$ H. P. gasoline engine in my shop. I think there is nothing better than power for the smith, for it is the best helper that he can have by far, and with a trip hammer he can do a great deal more work than two men can. I sell windmills and gasoline engines in connection with my shop work.
G. L. GUYER.

That Runaway Engine.—In answer to Mr. E. A. Thornton's query about runaway engines, will say, the trouble is with the governors of the engine as with all other troubles of irregular speed. The governors should be looked after closely and always

kept properly oiled. I would like to know how many feet a minute timber should travel in a wood lathe for the cutters to do good work. Suppose it was rolling on the surface, how can I determine the speed for each size?
M. L. KELLER.

The Way to Fit Shoes.—I work the shoes in pairs and fit the inside first. I do not use ready-made toes (they spoil the shoe in refitting), but jump the toes on. They are easier to take off and are much nicer. I never punch the shoe from the ground surface side unless the shoes are poorly creased. When putting on a new toe I use white sand for a flux, take a second heat and finish. Before putting on a new toe always close the heels of the shoe about a half inch, for they will spread.
GEO. W. TINKEY.

A Tire Bolt-Holder.—I took $\frac{3}{4}$ by $\frac{1}{4}$ -inch iron and bent it as illustrated. The hook A is so made as to fit the buggy felloe. I then take a good piece of tool steel and weld it on the large piece, as shown at B,



A TIRE BOLT-HOLDER.

and file two sharp points on it to fit on the head of the bolt. This is for use where the smith has no tire bolting machine. You can hold a bolt and twist it in two before it will turn.
L. E. PHIFER.

To Soften and Drill Cast Steel.—In answer to Mr. Carl Lechner, will say, heat the steel to a bright red, then take a pail of warm rain water (or any soft water) and with good strong soap that will lather freely, make thick suds to float on top of the water. Hold the steel in the suds until cool. Make a solution of two parts turpentine to one part spirits of camphor. Center punch the steel and use the solution in place of oil. Feed the drill slowly, using the solution often. Any common drill will do, you don't need a special drill.
J. W. ELROD.

Removing Galvanized Coating.—In answer to Mr. William Hodge's query, "How to remove galvanized coating," I give my way of doing it. Burn the coating off and as I want to weld the parts which are galvanized, I have to heat them and of course I remove the coating at the same time. I heat my iron or pipe to a white heat and never have any trouble in welding. I use only plain sand, clean, to be sure, as when I weld any stuff of this kind. After preparing one end of the pipe for welding, I plug the opposite end, so as not to burn the pipe.
FRANZ WENKE.

How to Soften Cast Steel.—Take a piece of gas pipe larger and longer than your work and put a cap or plug in one end. Mix powdered charcoal and sand of equal parts and put a layer of this in the pipe, then put in your work. Next, fill the pipe with the mixture and tamp down lightly. The last thing at night heat it through to a red heat, then cover well with hot coals and last of all cover with green coal. In the morning take it out of the forge and set aside until cold. I have annealed finished work in this way with success.
DAYTON O. SHAW.

An Interesting Letter from a Texas Smith.—I have a shop 24 by 60 feet and run two fires. I have every convenience except power. I have a Barcus shoeing stock that will handle any horse and a House cold tire setter which is a perfect success. I have used this machine for two years and could not get along without it. I get lots of tire setting from the customers of other shops. This I would not get if I did not have this machine. My prices are fair and I am making some money. I do a credit business with men who have a reputation for paying their debts. I attribute my success largely to close collections.
E. L. DOUGLASS.

A Canadian Shop.—I have a shop 36 by 18 feet and do a general business. There are about 1800 inhabitants in this town and I have the only shop. I keep a man all the time and we are always busy. I was told when I came here in 1899 that I would stray out in six months as three others had done before me, but I have a shop and lot; got them paid for, too. Prices are as follows:

New shoes..... \$1.30 a set.
Resetting..... .50
Spokes..... .18 each.
Rims one wheel..... \$2.00
Setting tires..... \$2.00 to \$4.00 a set.

I have lots of work.
J. D. HILTS.

Welding Toe Calks.—Many blacksmiths have trouble in welding toe calks, that is, the calks fall off when the horse takes a few steps. My way of welding toe calks so they will stay where they are put, is as follows: First of all, I have a clean fire. After setting the calk on the shoe, I take a light heat and hammer the calks down a little. By so doing I remove all the dirt. I then run flux between the calk and the shoe. After the first light heat I take a good second welding heat and hammer the calk down good and low. I never make very high toe calks as they only bother the horse. I use nothing but clean sand for welding and I never lose a calk.
FRANK WENKE.

Bolted Tires.—A test of bolting steel tires for the drivewheels of passenger locomotives is being made by the motive power department of the Pennsylvania R. R. If it proves successful, as preliminary trials indicate, the plan will be generally adopted.

The slipping of tires has been a source of much annoyance to railroad men for years. Frequently in applying the air-brakes to a rapidly moving locomotive the tires, becoming heated, expand and sometimes slip off the wheel. In other cases they break, and in both instances serious accidents occur.

A New Locomotive.—The New York Central's prize-winning locomotive No. 3000, exhibited at the St. Louis World's Fair, has high and low pressure cylinders of 15 $\frac{1}{2}$ inches, and 26 inches diameter, respectively, with 26-inch stroke. The driving wheels are 79 inches in diameter and coupled, the total weight on them being 110,000 pounds. The arrangement of the engine is perhaps its most unique feature. The two high pressure cylinders, located just forward of the saddle, connect to a pair of cranks in the axle of the leading pair of driving wheels inside the frames. Outside of the frames and abreast of the saddle, are the two low pressure cylinders connected to the rear driving wheels.

An Interesting Letter from Alabama.—It is not necessary for me to try to describe my appreciation of THE AMERICAN BLACKSMITH, but I will say that I have mastered three trades—blacksmithing, electricity and machine work—and take journals relating to each of them, but THE AMERICAN BLACKSMITH beats them all.

I have been head smith of this company for two years and have bought, as near as possible, all of my equipment from advertisers in THE AMERICAN BLACKSMITH.

We have built a respectable little town, nine miles of railroad, a large compressed air plant and have opened the best coal mine in the country.
W. J. CARROLL.

Information on Tempering Springs.—In answer to John Sheppard's query on tempering gun springs would say, I have good success tempering in oil. I forge my spring from old fork tines or some other good cast steel, and shape and fit them nicely. Then I heat the spring to a uniform red, have some good lard oil in a vessel and drop the spring into it. This will make the spring very hard. When cool, take a piece of sheet iron, lay it

over the fire, slightly curving it in the center, and lay the spring in the middle of it. Now dip your tongs in the oil and throw oil on the spring. Now blow your fire and let the spring lay in the oil until it turns gray. Then lay it to one side and let it cool. This will make a very even and tough temper and will rarely ever break. WM. GRAHAM.

Hanging a Bellows.—In answer to the man who wanted to know how to hang a bellows, I would advise him to hang them in the garret and get a good blower. I have a good blower and would not exchange it for any bellows ever made. I have a Reynolds Bolting Machine that can take all the taps off a wheel in about three minutes. I have also put in a Brooks cold tire setter, but I will not comment on that yet as I have only set three tires so far. I have tried several compounds and find the Banner, Climax and Boraxette good, if you use them as directed. I believe in trying to better my work and court the good will of all good people. Always tell the truth as to your work and what you can do. MAJOR B.

Filling Sarven Wheels.—I take out the rivets and spokes, make my spokes to fit and then dip them in glue; redrive them and bore and put in and clinch my rivets. After setting my tire, I place the wheel on my anvil, with the front of the wheel up and rehammer my rivets. I never have complaints about wheels done this way notwithstanding that I have had complaints when I did them the other way. I have ordered a mandrel and a horseshoeing rack from A. C. Schodorf and I wish to know if any of the readers of the journal are using one made by him and if they are good shoeing racks or not. I have ordered a barrel saw with foot power and steam power combined. I have no engine as yet, but as soon as I can I expect to buy one. I will run my hand saw by hand until I am able to get an engine. I get all the work I can do. I work two men and we are busy all the time. I did a thousand dollars' worth of business last year and hope to do more this year. G. P. BLANCHARD.

Some Prices from Oregon.—I run a small shop with two fires and have all up-to-date tools, employing from two to six men during my busy season. Our community is made up of farmers and fruit growers. There is also some saw milling and mining going on. This place is also the headquarters for a good many stock men, so we have a little of all kinds of repairing to do. Some of our prices are:

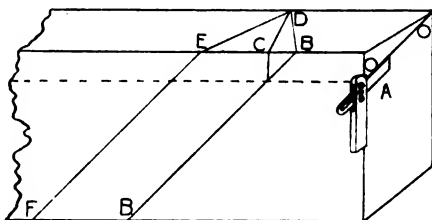
Shoeing, all kinds, per span	\$ 4.00
Resetting, per shoe	.25
Buggy tire setting, per set	3.00
Wagon tire setting, small size	3.00
Wide tires, each	\$1.00 to 1.25
Spokes and Felloes, each	.35 to .50
Three and four-inch felloes, each	.75
New buggy tires, per set	10.00
Sharpening plow lays	.35 to .50
New lays	3.50 to 6.00
Pointing plow	1.00 to 1.25
Wagon tongues	4.50 to 7.50
Tongue hounds, each	1.50 to 2.00
Bolsters	3.00 to 4.00
Bolster stakes	1.00
Axles	6.00 to 10.00

We have a mild winter here, but do some sharp shoeing. WM. GRAHAM.

To Temper Punch Die.—Build a high, dry fire, using coke or charcoal and heat your punch as far as you wish to harden it. Run a light, steady blast and keep the punch moving in the fire to get an even heat. Keep it in the coals as much as possible, but do not let the blast strike the heated steel. Cool in a bath of clean salt water, the temperature of which is 60 or 70 degrees. Work it round well until it stops singing, then take out and put in a kettle of boiling water, temperature 200 or 212 degrees.

Let it cook from ten to twenty minutes. If it is not convenient to use hot water, hold it over the fire until it is nearly as hot as you can bear your hand on; then polish with emery cloth and draw the temper on a hot iron. Turn it occasionally on the iron so as to heat it evenly and you will get an even color. DAYTON O. SHAW.

How to Bevel a Carriage Seat.—In answer to query on carriage seats, by "Beginner," will say, set the bevel at any incline you want and apply it to the end of the board as shown in the engraving. Next set the marking gauge and run a line as shown by the dots. Then take the same bevel as used at the end of the board and run the line BB, then square up from the intersection of BB and the dotted line to C. Now square across the top edge of the board from C to D and mark from D across top edge until it



HOW TO BEVEL A CARRIAGE SEAT

connects with line BB. The line D B will give a butt cut. If a mitre is required, measure where the bevel is applied, from O to O, space off the same distance from B to E and draw a line from D to E. Then draw another line from E to F at the same angle as at A. Now don't misunderstand me, if the distance from O to O is one inch, the distance should also be one inch from B to E. M. B. WAIDLEY.

Making a Plow Share.—The first thing to do when making a plow share is to fit the bar, then fit the share to the bar and take your bar off the plow and place it on the share. Have your fire clean. Take a good weld at the point and try it on the plow. If your bar is too long you can drive it up a little, but I never have to drive one up for I use a pair of tongs that don't let the bar of the share slip. Some of the prices we get in Texas are:

Pointing plows 10 inches and under	\$.40
Pointing plows 12 inches and over	.50
Sharpening plows 10 inches and under	.10
Sharpening plows 12 to 14 inches	.15
Four shoes, plain	1.00
Steel shoes	1.25
Filling wagon wheels, per wheel	3.50 and 4.50
Setting buggy tires, per set	2.00 and 2.40
" wagon tires	2.00
Shop-made shoes, per shoe	.50

Other prices are in proportion. S. S. T.

A Raise of Prices in Ontario.—I will give you some of our prices and how I get them. Two years ago I decided that I was working too cheap, as I was receiving 25 cents for new shoes and 10 cents for setting shoes. I raised the prices to 30 cents for new shoes and 12½ cents for setting and later 50 cents for new shoes and 25 cents for setting. A certain class of farmers struck up a howl against the blacksmith, but it did not last long. They got into line and the change of prices is now a thing of the past. I learned that the man who is always ready to howl for little or nothing is the customer who perhaps is yours today and some one else's tomorrow. Such men, in my estimation, are of no use to anyone, and are not worth treating as a customer. I have been in this place for twenty years and have a line of customers that have never left me, not that they get any special favors, but they are men of principle who believe in doing unto

others as they wish you should do unto them. Such men are easily held. Good honest dealings will keep them the year round, but it is the other class I mentioned that require a smith to have a paper such as THE AMERICAN BLACKSMITH so as to manage them for their pay. D. A. McDougall.

Some More Talk on Sarven Wheels.—We have been reading the articles on Sarven wheels and they make us tired. Surely, if a man cannot remove a rivet or even eight of them from a wheel and repair it with new spokes, he is no wheelwright. We repair a few every year and have as good luck with them as with any other kind of wheel. Where the mistake is made is in fitting the spokes. Do not try to drive a set of 1½-inch spokes into a 1-inch hub, it will not work. If only three or four spokes fit, get an old one out whole if you can, or make a pattern of some thin wood to just fit after taking out one spoke. If a whole wheel is to be repaired take your calipers and measure the hub and the size of the flanges, then strike your circles on a piece of paper and space off the number of spokes and draw lines running to the center. Fit the spokes very carefully so that four or five will lay flat on the pattern and just fill the space to the lines drawn. Now heat the spokes, being careful not to scorch the wood, and drive in hot glue. Let the wheel stand two or three hours, then put on the rim and set the tire. Now fit the rivets and head them up tight with a light hammer. We always bolt down wheels when setting the tires. OTIS GODING & SOY.

Mending a Cast-Iron Kettle.—It frequently occurs that an iron kettle becomes leaky and the fault of such leakage is generally found to be from defects in casting. A kettle is often too thin in some part and a hole is easily stove in or there are a number of sand flaws in certain parts that will show after a few years' usage. In small holes a copper rivet will sometimes be all that is needed, but where the hole is a good sized one, a patch is the best way to make the kettle fit for use. I have mended many kettles, so will give my way of doing it. For a hole, say one inch or so, I make a washer of about two inches in diameter, this I reduce to a feather edge at the outer edge and fit it hot for the inside of the kettle. I then make another of the same size and fit it on the outside so that the sharp edges of the washer fit well all around. I next drill a hole in the centre of each washer to admit a ½ or ¾-inch bolt. I then screw the inside and outside washer together with the bolt and tap them both (inside and outside) with a light hammer to make them fit better. I next take the white of an egg and some scale dust from the anvil block and work the two to a stiff paste. I then fill this in between the washers and in the hole in kettle and screw the washers firmly together. The job is now done and the kettle can be used at once, if necessary, as the paste will soon become as hard as iron. GEORGE NABLO.

A Letter from Illinois.—I am a subscriber to THE AMERICAN BLACKSMITH and would not do without it for twice the subscription price. I believe if all of our brother smiths would take this paper, we would get along very much better. If the blacksmiths of this country would follow up the Lien Law we would make money more easily. Below are some Illinois prices:

Horseshoeing, new	\$1.00
" old	.60
Wagon work rimming	1.50
Tire setting	.50
Axles	2.00
Reaches	.50
Tongues	1.25
Hounds, per pair	.80
Wagon boxes finished	6.00
Buggy wheels, rimmed	1.00

Tire setting.....	.50
Spokes.....	10 and .15
Painting.....	5.00
Plow sharpening.....	.15
Coulters.....	.05
Cultivator points.....	.05

I have a 2-horsepower Jack-of-all-Trades gasoline engine which is a great help. I can do more work with it in one day than I can with two helpers. I have a lathe, two emery grinders, one planer, one cutoff saw, one rip saw, one polishing outfit and I am now making a power hammer, a description of which I saw in your paper some time ago. I can run most all of my machines at once except the planer, which makes my engine "snort" pretty well. JACOB VARNER.

Boring Shot Guns.—Referring to Brother E. C. Johnson in the February AMERICAN BLACKSMITH, will say, that I do not agree with him all together in regard to boring shot guns. A part of his way is mine, but I can't agree with him in boring a recess to form a choke. My reason is this: In forming or boring a recess, you leave a space to allow the gas to escape ahead of the lead and you also weaken the barrel. This also leaves a fine box to hold dirt, especially if you use Brother Johnson's favorite powder, that old, noisy, dirty, black stuff. I do a great deal of gun work, reborring, stocking and fitting new barrels. My method of reborring and choking an old gun is in some ways the same as Brother Johnson's, but I start cutting at the muzzle of the barrel. I insert my bit or tool (a Batchloss choke boring tool) at the breach of the barrel, pass it through and out at the muzzle after covering it with soap suds. Then I soap it again and put the tool back until the front end of the bit or the cutting edges have passed the muzzle about half an inch; then I spread the bits and start cutting. I pull the tool toward me in boring, until it has cut a thin chip, the full length of the barrel. I repeat my process until I get all the bits out. I then use a tool of my own make to finish at the muzzle. This tool is a square bar of steel about $\frac{3}{8}$ of an inch square tapered at one end to suit the taper I want the choke to have. This tool I fasten on a $\frac{1}{4}$ -inch rod with a limber joint and back it up with a piece of wood to make it cut. Then I have another tool which I also made; it is something like a Tomlinson Cleaner that I use for smoothing out, only instead of using wire gauze I use leather, with oil and emery flour. I use this tool in a bit-stock the same as the other tools. I then polish with fine emery cloth and oil. A job done in this way cannot be told from factory work. T. S. HOLLOWAY.

Handling a Poor Paying Customer.—In answer to G. P. K.'s query as to handling poor paying customers, I would advise him to cut them out at once, they are expensive. You cannot hold the horse for the work done in the past, therefore, you have nothing but a promise. What is it worth? What would a promise look like when your hardware drummer came? I think that when a customer fails repeatedly to meet his obligations it is time to cut him out. I think you had better keep your coal and material in your shop and save your labor. If you do all of their work in this way, you would not get so much as a good look unless they want some more work done and take a promise for pay. They would not speak a word in your favor and if you have any labor and material to give away give it to some good, honest man who pays and will speak a good word for you. Notify your brother and neighbor craftsman of your bad customer and then if he gets beaten by him he ought to be.

In regard to side lines, I am in a country town and handle a little hardware such as stove pipe, nails, door locks, screws, bolts,

plow shares, fencing wire and staples, repairs for different farming implements and handle Dr. A. C. Daniels' Veterinary Medicine, which nets a nice little income. I also have a little farm of seventy-five acres which is very handy to have. When an honest customer has run a good sized bill and has a calf, colt, some pigs, sheep or something like that which he wants to sell, I can buy at a reasonable price and put it on the farm.

Then again the farmers who run accounts want to sell some of their crops to pay off their accounts so I take corn, wheat and potatoes as much as I can for their bill and keep it until spring, selling it with a good deal better interest than if I were to run to the bank with every \$5.00 out of ten that I get. A. B. ANDERSON.

Horsepower of Water Wheel.—I intend putting in power and would like to have you inform me as to the rule for determining the horsepower of an overshot water wheel which is twelve feet in diameter with two-foot face and six-inch rim, to be run by 100 miner's inches of water. Suppose I give the boxes that lead water on to wheel about 24 inches grade to the rod, will it mean an increase of power, or not, more than on a smaller grade? Please send a rule that applies to any size wheel or any amount of water. ORSON C. ERMATINGER.

In Answer.—If you wish to find the horsepower of a water wheel, you can apply the formula .00142 VH, where V is equal to the volume of water delivered to the wheel in cubic feet per minute; H the head measured in feet or the distance between the surface of the water in the wheel pit and that in the penstock when the wheel is running. This formula allows an efficiency of 75% for the wheel, or in other words, the formula would be correct for a wheel which delivers three-quarters of the total energy due to the fall of water through a distance equal to the head.

If the wheel is of sufficient capacity to take care of the entire flow of water, its dimensions do not enter into the problem of calculating the horsepower, except in so far as they affect the efficiency of the wheel.

To apply this formula to your problem, you must first determine the volume of water delivered to the wheel in cubic feet per minute. A good average value for one miner's inch is a flow of $1\frac{1}{2}$ cubic feet of water per minute. One hundred miner's inches would mean a flow of 150 cubic feet of water per minute, and multiplying this by .00142 and the product by twelve feet, which we presume is the head, the result is about 24 horsepower.

In answer to the second part of your question, the greater the velocity with which the water enters the wheel the greater will be the power generated, as the wheel will thus act as an impulse wheel as well as simply an overshot wheel. A. B. B.

Tempering Oyster Knives.—In answer to Mr. Ridgeway's query about tempering oyster-knife blades will give the following recipe. Forge your knives at a good forging heat, by color I would call it lemon, if your furnace or forge is not in a well lighted place, where there are windows or skylights. You will always find that much better results can be had in a somewhat dark place than in a well lighted one. After having forged your knives to the desired shape, heat them evenly and slowly. Hammer them on both sides with light blows so as to close or pack the grain. Then reheat very light and allow them to cool slowly, putting them in a box containing charcoal dust. This will relieve strains. If you are using a common forge, build your fire so as to have a small bank on each side, place a piece of flat iron, about $\frac{1}{4}$ -inch

thick and 4 inches wide by 5 inches long, in the middle of the fire. Then take a larger piece and lay it across both banks of the fire and put your knives on this latter piece. Let them warm up until the under piece is hot enough to heat on, and the top piece will do very nicely to draw the temper on with a gentle blast. This will give you an oven-like fire, which, if properly handled, will give good results on small work. For the hardening bath, use salt and water (don't bother if you cannot get spring or rain water). Clean the water with plenty of salt, there is nothing better. The heat should be the lowest that the steel you are using will harden at, thus giving you a fine silky-like fracture, which, by the way, should be first made sure of. Dip your knives, large end first, perpendicularly, taking them out while yet warm and drop them into a vessel containing oil (linseed or fish oil). If oil cannot be had, boiling water will do. The temper will depend somewhat on the condition that the edge is to be on the finished knife, that is, if the edge is to be rounding it should be harder than if it were to be a straight bevel to a thin edge, but it is safe to try or draw to a copper color. The temper of the shank or tang on the knives should be drawn in a bath of hot lead which is covered with powdered charcoal. FLARNHAM.

To Prevent Water from Freezing.—Will you please tell me of a solution to put into water used for cooling gasoline engines to keep it from freezing? Something that will not damage the engine. H. K. LUNDT.

Non-Freezing Solution.—There are now in use and to be recommended several non-freezing mixtures or solutions for the cooling tanks of gas engines, to prevent freezing up and bursting of the water jacket surrounding the cylinder. A solution of chloride of calcium in water is probably the cheapest, most convenient and most commonly used. Commercial chloride of calcium can be purchased in quantities at one cent per pound, and 4 pounds to each gallon of water will form a solution that will not freeze at a temperature of 17° below zero. $3\frac{1}{2}$ pounds to the gallon at 8° below zero and 3 pounds to the gallon at 1° below zero. Chloride of calcium solution has a very trifling if any deleterious effect upon the iron walls of the cylinder, pipes or cooling tanks. In fact it is claimed by persons who profess to have investigated the matter closely that no more effect is noticeable after its continued use than if water alone is used for the same length of time and under similar conditions. Calcium chloride is antiseptic and to a considerable extent disinfectant as well as a deodorant. It does not form a sediment in the tank nor evaporate, but absorbs moisture from the air, consequently less need of renewing or replenishing water lost by evaporation. It is sold in hard, stony cakes, chunks or crystals. Cakes or chunks should be broken up into small pieces before they are put into the water tank, where they will be gradually dissolved. While it is necessary only in the winter time, no ill effects have been noticed from its continued use or carrying it in solution from one year to the next.

Another very effective and harmless mixture, although more expensive than the above, is a 20% solution of glycerine with a solution of chloride of zinc, $\frac{1}{2}$ pound to the gallon of water. This solution is made by first adding $\frac{1}{2}$ -pound of the chloride to each gallon of water, after which is added one-fifth of its bulk of glycerine. It is claimed by some that this mixture has the disadvantage of becoming rancid and filthy in warm weather, which necessitates its complete loss after the freezing season is over. E. W. LONGANECKER.

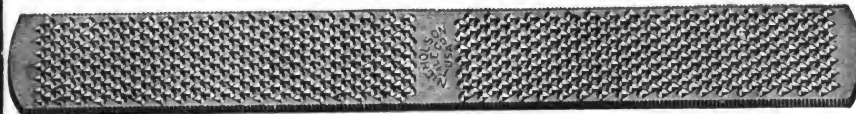
NICHOLSON FILE COMPANY



PROVIDENCE, R. I.

U. S. A.

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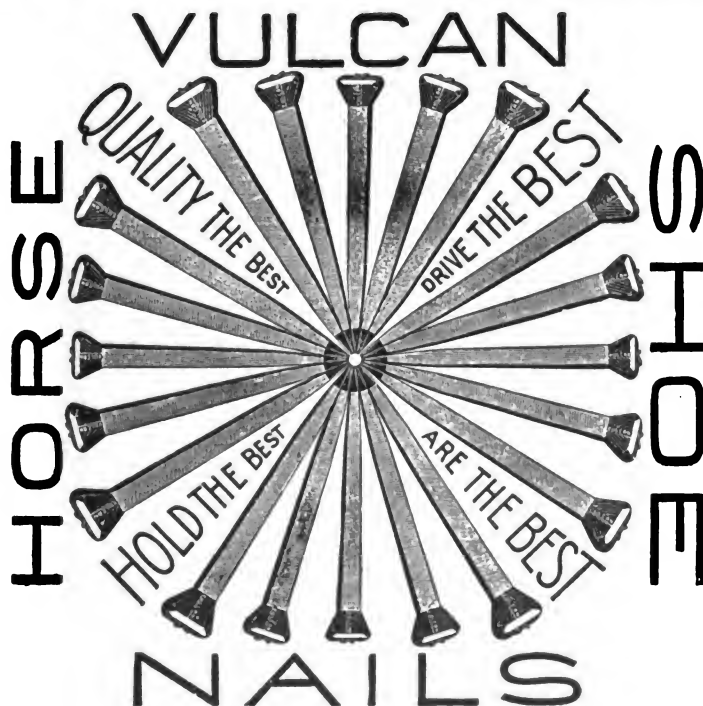


FILES AND RASPS

Blacksmiths Recommend Our Rasps

—BECAUSE—

THEIR WEARING QUALITIES HAVE BEEN PROVEN.



THE FOWLER NAIL COMPANY, SOLE MANUFACTURERS, SEYMOUR, CONNECTICUT.

Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Mch. 27, 1906, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.			
1/4 in..	round or square;	Iron, \$2.80;	Steel, \$2.90
5/16 in.,	"	"	2.40 " 2.50
3/8 in.,	"	"	2.20 " 2.30

Flats—Bar and Band.			
1/8 x 1 in.,	Iron.....	\$2.30;	Steel.....\$2.90
1/4 x 1 1/2 in.,	"	2.20;	"
3/8 x 1 1/2 in.,	"	2.40;	"

Norway and Swedish Iron.			
1/4 in.,	round or square.....		\$4.90
5/16 in.,	"		4.50
3/8 in.,	"		4.80
1/2 x 1 in.,			4.90
5/8 x 1 1/2 in.,			4.20

PADDOCK-HAWLEY IRON CO.

Iron, Steel, Carriage and Heavy Hardware,
Trimings and Wood Material.

ST. LOUIS, MO.

CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

FOR SALE.—Blacksmith and wood-working tools and stock in a rented shop.

H. H. NICHOLAS, Speer, Ill.

FOR SALE.—Blacksmith shop and tools and dwelling. A two man shop. Write for particulars.

WM. YOUNT, Okolona, Ohio.

FOR SALE. Blacksmith and implement business. Two fires, complete set of tools. Have worked five men.

Wm. GRAHAM, Union, Ore.

FOR SALE.—Blacksmith shop, dwelling, cheap. Trade \$1,200 per year; healthy location, climate mild. For particulars write.

W. J. UPDYKE, Meridianville, Alabama.

FOR SALE.—General repair shop, in irrigated district, best of location and trade; shop 24 ft. sq., one set of tools, wood worker's tools and stock. No opposition. All for \$700 if taken soon.

A. GAUVAIN, Minatare, Neb.

FOR SALE.—Blacksmith and wheelwright shop in prosperous town of twelve hundred, in Central New York. Now occupied. Been a blacksmith stand for fifty years. Owner not a blacksmith. Sell at a sacrifice.

W. O. STEELE, Grenloch, N. J.

I CAN SELL YOUR BLACKSMITHING BUSINESS (with or without real estate) no matter where it is or what it is worth. Send description, state price, and learn my wonderfully successful plan.

W. M. OSTRANDER,

109 North American Bldg., Philadelphia.

WANTED.—A Blacksmith, A Wheelwright, A Carriage Painter.—To take active part in those departments, in a modernly equipped, long established, Wagon Factory, situated near New York City. Men only who can invest \$2500 each. The business has doubled itself six times in the past three years, and has grown to such proportions as to make it necessary for the Owner to divide the work, which he seeks to do by securing an interested person at the head of each said department. To such as can take advantage of this opportunity Good Wages and proportions of the profits will be paid. References given and required. Address,

WAGON WORKS, 7 Webster St., Newark, N. J.

LIST OF SECOND HAND GASOLINE ENGINES IN FIRST CLASS RUNNING ORDER, at the following cash prices:

1 1 1/2 H.P. Stover Engine on combined base.....	\$ 58.00
1 3 1/4 H.P. Alamo Engine with dynamo for sparking device instead of battery, run about three months.....	75.00
1 12 H.P. Weber Engine, used two years, in first class condition.....	185.00
1 4 H.P. Stickney Engine, in use about two weeks.....	90.00
1 5 H.P. Lewis-Webster Gasoline Engine, horizontal, in good running order.....	110.00
1 6 H.P. Lewis-Webster Gasoline Engine, in first class condition.....	165.00
1 1 1/2 H.P. Webster Handy Man, with pumping jack, used about thirty days.....	85.00
1 3 H. P. Webster Engine, self-contained base with water tank.....	100.00
1 3 H.P. Webster Engine, not self-contained.....	90.00
1 2 1/2 H.P. Webster Engine.....	75.00
1 4 1/2 H.P. Webster Engine.....	125.00
1 10 H.P. Webster Engine, in good order.....	220.00
1 12 H.P. Webster Engine, in good order.....	275.00
1 Fairbanks Jack of all Trades, good as new.....	90.00
1 6 H.P. Fairbanks-Morse gasoline engine, good as new.....	190.00
1 3 H.P. Burrell Engine, good as new.....	90.00
1 2 1/2 H.P. Webster Engine, used 60 days.....	75.00

ALLEN P. ELY & CO., 1110 Douglas St., Omaha, Neb.

WANTED AND FOR SALE—Continued.

WANTED—Agent in every machine shop for New Wiet-Goehe caliper gauge. \$20 worth of tools for \$2.00. Double your daily wages while selling them and still work at your trade. Big profits. For particulars address, **WIET-GOETHE COMPANY, Sacramento, Cal.**

New Books

ARTISTIC HORSESHOEING is the title of Prof. Geo E. Rich's latest book. It is a practical scientific treatise, giving improved methods of shoeing and special directions for correcting faulty action in trotters and for shaping shoes to cure different foot diseases.

This attractive volume contains many illustrations, 284 different styles of shoes being shown and explained. It is cloth bound, 217 pages, price, \$2.00.

Trade Literature and Notes

JUST OUT—the new Spring catalogue of Cray Bros., Cleveland, Ohio. It is a handsome, conveniently prepared book, illustrating, describing and listing everything used by blacksmiths and wagon makers. It ought to be in the hands of every reader of the paper. Sent free upon request.

"**THE JUNIATA NEWS**" is the name of a new publication in the interest of Juniata horse and mule shoes, and also of all things connected with a blacksmith shop, issued by the American Steel & Wire Co., Chicago. Copies will be sent free to any one who will send address.

THE O. B. READ MFG. CO. of Troy, N. Y., inform us that, at the present time there are over 2,000,000 now in use—their rein supporter—and claim that this novelty, together with their rein holder and rein fastener, has prevented thousands of accidents. Their advertisement on page xxvii gives further information concerning these devices.

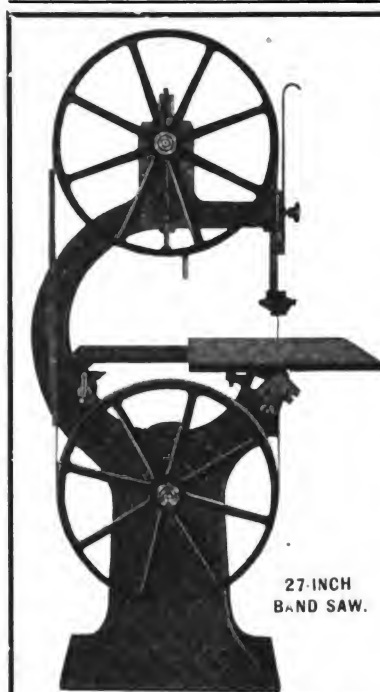
IN THIS ISSUE will be found the initial announcement of the Gogel Mfg. Co., 234 S. Erie St., Toledo, O. Among their specialties, the Gogel Blair Pipe, the Modern flare-board-iron and the Gogel fifth wheels, they desire to call special attention to the many superior features of the latter. These are made in four sizes, from 12 to 15 inches in diameter, for 1 to 1½-inch axles.

They guarantee their goods to be of the very finest quality and invite the correspondence of blacksmiths, carriage and wagon-builders. One of their new interesting circulars will be sent free to any address upon request.

THE WM. SCHOLLHORN CO. of New Haven, Conn., have put on the market a new end cutting bolt clipper. It is entirely new in design and adapted to the practical needs of blacksmiths and wagon-makers. It is 24-inches long, weighs 4½ pounds, and cuts bolts and rivets ½-inches in diameter.

HANDSOME is the catalogue which comes from the Geo. D. Pohl Mfg. Company, of Vernon, N. Y., attractively printed and illustrating their line of Advance gas and gasoline and distillate engines for operation with gasoline, naphtha, distillate, natural gas, city gas or producer gas. It is manufactured in a variety of types and sizes.

EVERY WELL-EQUIPPED SHOP can find use for the new lever punch manufactured by the Walker Tool Company, of Lansing, Mich. The cam and plunger are made of the best tool steel and work in the long bearings. The cam box and lever are made of cast steel, and the lever may be worked from either the front or back of the machine, as desired. The power is applied in a rigidly perpendicular direction. The machines are cast in one solid piece. The levers are keyed to the cams and the shears are adjustable. The Walker Tool Co. will be pleased to correspond with interested parties and furnish such additional information relative to the tools as may be desired.



OUR LATEST MODEL "DEFIANCE"

ITS

**SIMPLICITY GUARANTEES
GOOD RESULTS
— AND —
SATISFACTION**

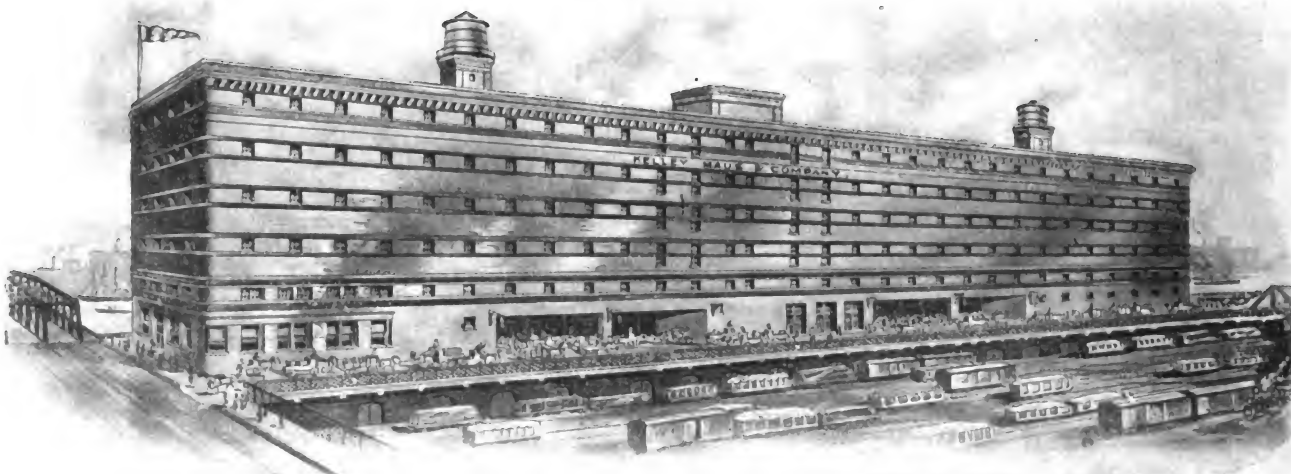
EVERY TIME AND ALL THE TIME

Write Us for Particulars and Prices.

THE SIDNEY TOOL CO.,
BOX F.
SIDNEY, OHIO, U. S. A.

Our Immense Stock

and Steel **ENABLES US TO GIVE YOUR ORDERS** * * * * *
Immediate Attention. * **Send Them to—**



LARGEST CONCERN IN THE WORLD DEVOTED EXCLUSIVELY TO THE ABOVE LINES.

KELLEY, MAUS & CO., Lake Street Bridge
Send for List of Spring Bargains. **Chicago.**

RUBBER RUNABOUT, \$35.00
TIRED TOP BUGGY. \$27.50
BUGGY TOPS, \$4.50



Write for 100-page Catalogue. It's free. Compare Our Prices.
BUOB & SCHEU, 1883, 500-520 EAST COURT ST., CINCINNATI, OHIO.

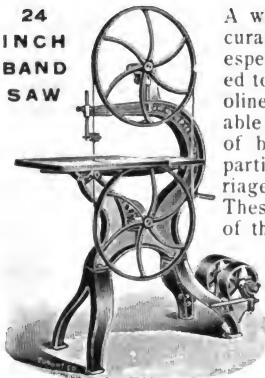
LOTS AND LOTS OF BLACKSMITHS

have sent us in one or more new subscribers to the paper. **HAVE YOU?** If not, why not secure one new subscriber to THE AMERICAN BLACKSMITH during April, and let us extend your subscription six months as a reward? What do you say?

**AMERICAN BLACKSMITH COMPANY,
 BUFFALO, N. Y.**

Built to Stand the Test of Time

24
 INCH
 BAND
 SAW



A well-made accurate machine; especially adapted to run by gasoline engine; capable of all kinds of band sawing, particularly carriage repair work. These are a few of the fine points of Marston's Band Saw.

Drop us a card.

We will gladly send Prices and Circulars.

J. M. MARSTON & CO.
 222 Ruggles St., Boston, Mass., U. S. A.

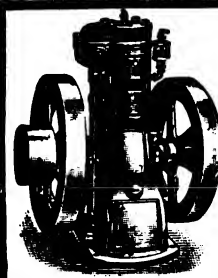
HANFORD'S Balsam of Myrrh

WILL HEAL

**Bad Galls, Kicks, Wire Cuts, Calks,
 Nail Wounds, Wind Puffs,
 Thrush, and Any Sore.**

It cleanses and heals. It counteracts the effect of poison from rusty nail wounds, removes proud flesh and gangrene. It will stop a fresh cut from bleeding almost immediately, and heals it very quickly. Is sold under a guarantee. A cabinet free **Blacksmiths are having great success selling it.** Write us for particulars.

G. C. HANFORD MFG. CO., Syracuse, N. Y.



"Accurate as a Clock—Quick as a Sewing Machine."

Kneeland Gas or Gasoline Engines

Little giants for power. Simple, durable, strong in every part. Easily operated. Economizers of time and fuel. **KNEELAND ENGINES** are the best power for small shops.

Made in Sizes from 3 to 6 Horse Power.

We've an interesting booklet that *tells all about them.* Mailed **FREE.** Write for it.

Agents Wanted

The Kneeland Mfg. Co., Box B, Lansing, Mich.

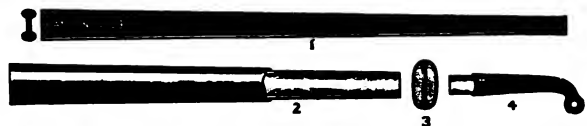


Broken Bows are Unavoidable with Old Style Fillers.

New invention worth 20 times its cost. The only device known that prevents rear steel bow sockets for carriages, automobiles, and buggy tops from bending and breaking is

COLE'S PATENT STEEL FILLER.

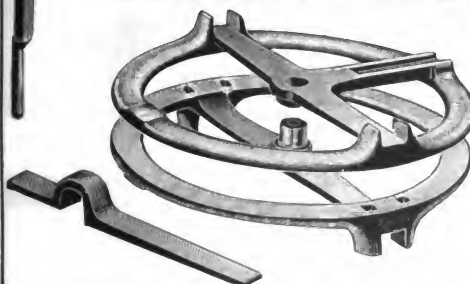
Can fill orders for bow sockets of standard makes, either full sets or single tubes, with rear tubes re-enforced with Cole's Patent Filler, (labeled with cut of filler.) Warranted not to break. Write for prices.



H. W. COLE & CO., 69 W. Jackson Boulevard, CHICAGO, ILL.

A FEW OF OUR SPECIALTIES

**THE GOGEL BLOW PIPES
 THE GOGEL FIFTH WHEELS
 OUR NEW FLARE BOARD IRONS**

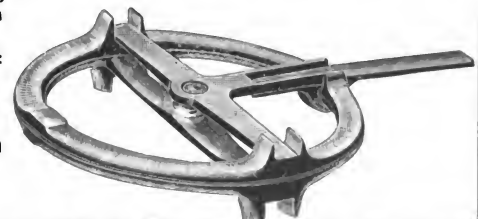


EVERY CARRIAGE AND WAGON BUILDER

Is invited to write for our New Interesting Circular. Sent free to any address upon request.

**—THE—
 GOGEL MFG. CO.**

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 TOLEDO, OHIO.

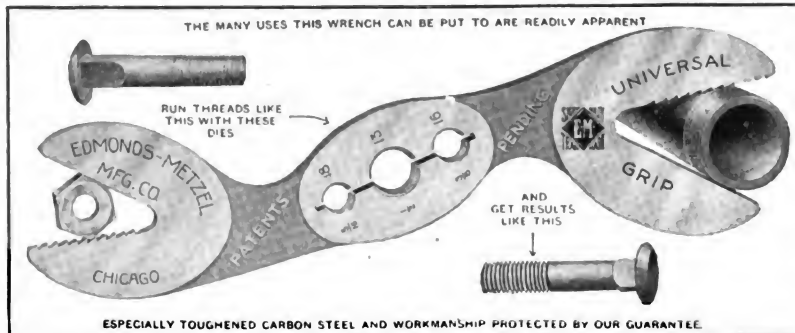




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Sold by all
jobbers at

\$4.50 per dozen, guaranteed. Get the best at the right prices—Money back if not satisfactory. If your jobbers cannot supply you, write us.



All special and foreign threads furnished on request. This tool is indispensable in the shop, household, with autos and on the farm. Be sure to specify Universal Grips and take no substitute.



THE EDMONDS-METZEL MANUFACTURING CO., 152-160 S. Jefferson Street, Chicago

Your Hack Saw Troubles

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



West Haven Manufacturing Co.
NEW HAVEN, CONN.

Important Information.

Read and be Convinced.

Spavinoff is a salve composed of several ingredients, so mixed as to be mild yet very effectual. It will cure spavin, ringbone, splints, curbs, sweeney, galls, sores, etc.

Spavinoff is now being used in place of the knife and burning iron to remove all unnatural bunches on horses and cattle.

Spavinoff will not injure your horse in the least but will make him sound and clean of all blemishes, that we advertise to cure, if you follow the directions accurately. We advise giving horse complete rest during treatment, although it is not necessary in all cases. Do not expect a cure in a few hours.

If you are not satisfied after 30 days' trial we will refund your money.

CHURCH BROS., Afton, N. Y.

THE BOOB WHEEL CO.

SPECIAL NET PRICE
on No. 2 Sarven Patent Wheels.
(In the White)

Steel Tired Wheels Size of tread and price per set.	Height 36 & 40 & under	Height 38 & 42	Height 40 & 44	Height 42 & 46	Add for 1000 mile axles and boxes set (welding & setting axles add 80 cents)
3/4 inch	\$5.75	\$13.50	\$14.00	\$15.00	\$1.90
7/8 inch	\$5.85	14.50	15.00	16.00	2.10
1 inch	6.10	16.00	16.75	18.25	2.10
1 1/4 inch	8.25	24.00	25.00	27.00	2.75 H.P.

Wheels, with Standard Cushion Rubber Tire On.

Size Tire	Height 36 & 38	Height 36 & 40	Height 38 & 42	Height 40 & 44	Axles
1 inch	\$18.75	\$19.00	\$19.50	\$20.00	\$1.90
1 1/4 inch	21.50	22.00	22.75		1.90

We can re-rubber your wheels, prices ranging from \$6.75 up. Prices on other heights, (rubber tired wheels) in proportion, for example: 36" & 44" same as 38" & 42" and 36" & 48" same as 40" & 44" 1/4 set orders 42" high, one half price of 40" & 44", etc. **Compressed Band Wheels, extra per set, 50 cents.**

Painting wheels, three coats, \$2.00 per set, and four coats, \$3.50 per set. The above wheels are standard grade and have been used on new work with entire satisfaction, but for city and country use when extreme hard surface is required, we recommend our second growth white hickory wheels, at a small additional cost of \$2.50 per set.

Looking up reference always delays first order, and as an inducement for you to send cash in full with first order, you can deduct 25 cents per set on steel tired wheels and 75 cents per set on rubber tired wheels as freight allowance. Freight only averages about 65 cents per set for every 500 miles. No C. O. D. unless \$3.00 per set in advance. For prices on larger sizes see catalogue.

Repair grade wheels with steel tires \$1.50 for 3/4 inch tread, and \$3.90 for 1 1/4 inch tread.

Buggy gears with wheels and shafts, all ready for body, \$16.95 delivered.

Send for Catalogue A.

CINCINNATI OHIO

IRON

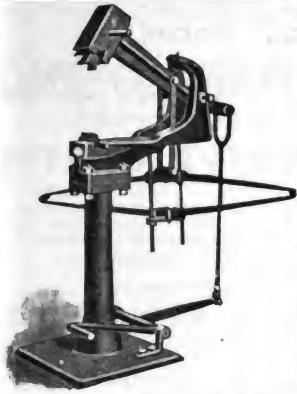
ANGLES, BARS, PLATES, SHEETS, RIVETS, PIPE,
SHAFTING, ETC.

STEEL

Kept in stock at Cleveland for immediate shipment,
or forwarded direct from mills at lowest market prices.

SEE MONTHLY STOCK LIST.

**THE
BOURNE-FULLER CO.
IRON, STEEL
PIG IRON
COKE
Cleveland, Ohio.**



FOOT POWER HAMMER

A FOOT POWER HAMMER

The most convenient machine a smith could buy. Carefully constructed, easy to operate. Strong, Powerful, Durable. Requires no engine to run it.

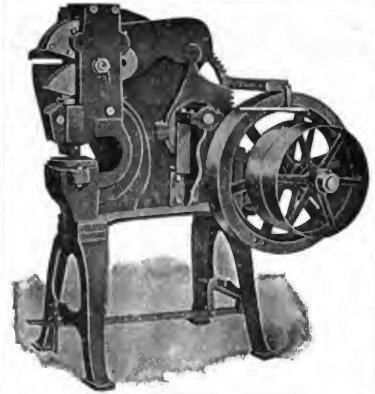
Does a Wide Range of Work. Leaves Both Hands Free.

WE ALSO MAKE A SPECIALTY OF
BLACKSMITHS' PUNCHES

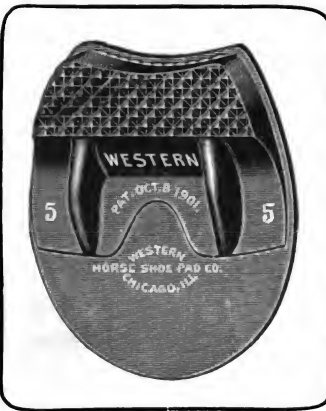
It will pay you to write for our Bulletins.

THE C. E. SUTTON COMPANY

TOLEDO, OHIO, U. S. A.



BLACKSMITH PUNCH

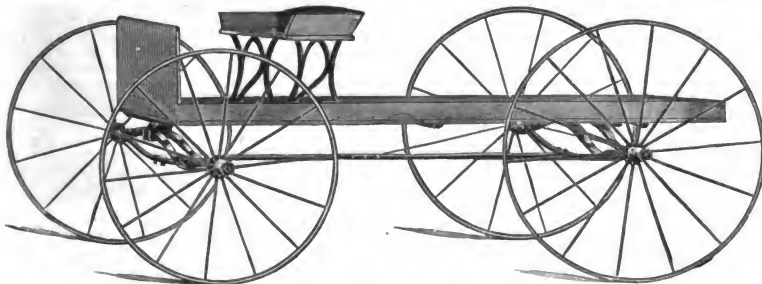
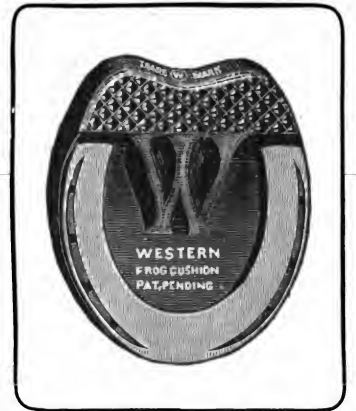


Do You Use Western Pads? If Not, Why Not?

Did you ever stop to consider what the name "Western" means in connection with "Pads"? If you have not, we want to say right here, Mr. Horseshoer, that "Western" stands for "Quality, Design and Freedom from Freak Ideas."

Use Western Pads and be up to date
First Rubber Company

Sole Manufacturers
156-158 Lake Street Chicago, U. S. A.



Write for
Catalog
and
prices
on
full line
of gears.

PEERLESS MILK WAGON (Short turn)
FOSBURG SPRING AND GEAR CO., ROME, N. Y.

PATENTS that PROTECT
72-p. Book Mailed Free
R. S. & A. B. LACEY, Patent Att'ys, Washington, D. C.
ESTABLISHED, 1869.



The Greatest Farm Engine is the Fairbanks-Morse Jack-of-all-Trades

Awarded Gold Medal at World's Fair, 1904.

It weighs about half a ton and develops over two H. P.; sent ready to connect to your pump if desired.

Cut out complete advertisement and send to
Fairbanks, Morse & Co., Monroe St., Chicago, Ill.

Please send me illustrated Catalogue No. B 487

Gasoline Engines. I may want.....H. P.
Engine to run.....
Name..... Street No.....
Town..... State.....

WE WANT AN AGENT

in every city and town to sell

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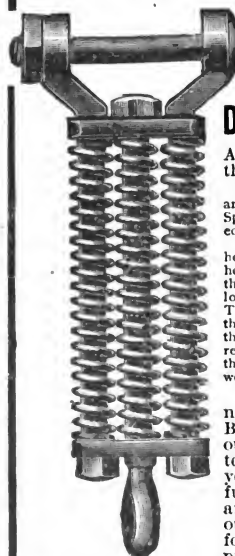
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All wagon owners need them.

For simplicity, durability and usefulness, our Draught Springs simply cannot be equalled.

They act as a cushion to the horses' shoulders, they HELP horses START heavy loads, they assist in drawing the load after it is in motion. They prevent collar wounds; they save from twenty to thirty per cent. in harness repairs; prolong the life of the team and increase their working capacity.

We now have a large number of successful Blacksmiths acting as our agents—we have territory for more. Will you represent us? We furnish sample springs and printed matter to our Agents. Write us for our liberal agency proposition.



BEECHER DRAUGHT SPRING CO.
NEW HAVEN, CONN.

One Hundred Prizes

Value \$500.00

GIVEN AWAY **ABSOLUTELY FREE** DURING 1905

LIST OF PRIZES.

- 10 No. 400 Champion Steel Blacksmith's Blowers, See page 51.
- 10 Royal Western Chief Steel Blacksmith's Blowers, See page 53.
- 20 Pair Giant Hoof Parers, See page 37.
- 20 Brass Blacksmith's Rules, See page 168.
- 30 Wostenholm-Farriers' Knives, See page 34.

To the Ten Customers whose purchases total the greatest in Dollars and Cents from January 1st., 1905, to January 1st., 1906, we will give Absolutely Free a No. 400 Champion Blower.

To the Ten Customers whose purchases are second in amount during this period, we will give Absolutely Free a Royal Western Chief Blower.

To the Twenty Customers whose purchases are third in amount during this period, we will give Absolutely Free one pair of Giant Hoof Parers.

To the Thirty Customers whose purchases are fourth in amount during this period, we will give Absolutely Free one Brass Blacksmith's Rule.

To the Thirty Customers whose purchases are fifth in amount during this period, we will give Absolutely Free one Wostenholm-Farriers' Knife.

In the event of a tie between competitors for any of the prizes offered, the value of such prize will be equally divided.

100 PRIZES FOR 100 CUSTOMERS

IMPORTANT.—We wish to explain emphatically that our business, while large in volume, is composed entirely of small orders. We do business entirely by catalogue, eliminating all expense for the employment of traveling men. These catalogues are distributed throughout the country, and our great volume of business is made up of many small orders. We mention this as assurance that your chance of winning one of the prizes is equal to that of your neighbor's, or anyone who may compete. Remember, **SOMEONE HAS TO WIN.** This is not a game of chance, but a reward for your business.

OUR CATALOGUE is the most complete ever published dealing with goods especially for the Blacksmith and Wagon-maker. It is **VALUABLE** for reference; it is a **MONEY-SAVER.**

Our 1905 catalogue will be sent Free to any Blacksmith or Wagon-maker, and we invite you to ask for them. Will far eclipse anything published for the trade before. We are waiting and ready to hear from you.

**STOCK THE LARGEST,
GOODS THE BEST,
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**THE BARLOW
HARDWARE CO.**
Corry, Pa.



RICH'S NEW

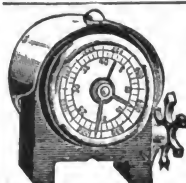
ARTISTIC
HORSESHOEING

MY LATEST BOOK ARTISTIC HORSESHOEING SHOULD BE IN EVERY UP-TO-DATE SHOP. THE PROGRESSIVE SMITH

will find it invaluable in his every day work. A practical, scientific treatise on improved methods of shoeing. Special directions given for correcting faulty action in trotters and for shaping shoes to cure different foot diseases. 284 different styles of shoes illustrated and explained. **Cloth bound, 217 pages, Price \$2.00.**

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A RELIABLE, DURABLE ODOMETER

which accurately records the distance travelled by any wheeled vehicle, and announces the passing of each mile by a sharp stroke of a BELL.

EVERY DRIVER SHOULD HAVE ONE. To liverymen it affords absolute protection. Special inducements offered blacksmiths and wheelwrights. For particulars address

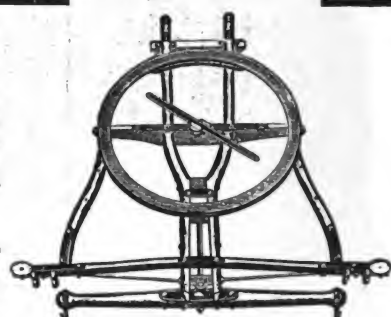
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Send for New 1905 Catalogue and Price-List.

National Gear Company,
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NATIONAL NEW YORK GEAR.
A Standard the World Over.

The latest improvements

in our steel socket shaft ends, are that we are now making them of Double Tube steel, the inner tube being pressed and crimped into the outer tube. A spliced joint where the woods meet, giving them so much greater strength that the shaft will not break where repaired, and prevents working loose and rattling, which was one fault with the old style without the splice joint. A nickel tip. Are enameled black, and are equal to the best leather finish.

We are the original manufacturers of shaft ends.

When buying why not get the best—always specify for our spliced joint. If your jobber cannot supply you, write us.

THE IMPROVED DOUBLE TUBE STEEL SOCKET SHAFT END



CUT SHOWING SPLICE JOINT.

STEEL SOCKET SHAFT END CO., Cleveland, Ohio, U. S. A.

Braze Cast Iron with **BRAZIRON** **CHEAP EASY**

Opens up a new field of profitable work for every blacksmith and machine shop; mends broken machinery, cracked cylinders, anything of cast iron. Write for full particulars, prices and testimonials. Send 12 cents in stamps for samples of Braziron and our new flux. Sample sufficient for several jobs.

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"Union" Combination Self-Feed Rip and Cross-Cut Saw

(Almost a complete workshop in one machine.)

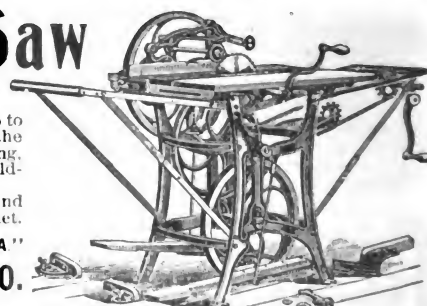
is suitable for various kinds of work:—ripping (up to 3½" thick), cross-cutting, mitring, etc., and with the addition of extra attachments, rabbeting, grooving, gaining, dadoing, boring, scroll-sawing, edge-moulding, beading, etc.

The heaviest, most substantial, accurate and easiest running machine of its kind on the market.

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Columbian Hardware Co.

CLEVELAND, OHIO.

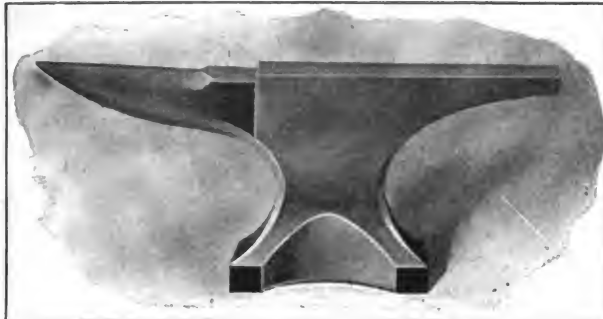
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ingot steel. Each
one is protected by
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antee. Built to
stand the test of
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constructed by the
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men. Their
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have jaws forged
from one piece of
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turn both calks
at one heat on flat
front jaw. Every
vise carefully in-
spected before
leaving factory.

COLUMBIAN ALL-STEEL ANVILS AND SOLID-BOX WROUGHT STEEL VISES
Are noted for their superior quality. Only first-class material
and workmanship employed in their construction.

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will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excel-
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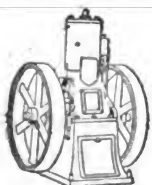
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KEROSENE ENGINES.

Safe, Sure, Simple, Reliable and Efficient. Most Economical Power
in the World. Especially Adapted for Shops Using Small Power.
Cheaper and Safer than Gasolene. No Sparker. No Igniter.

WRITE FOR DESCRIPTIVE CIRCULAR AND PRICES.

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READ'S REIN SPECIALTIES

The best selling devices on the
market. Prevent accidents
and add to the pleasure
of driving.

Read's Rein Supporter

will hold the reins
in the right position
on horse's hip. Over
2,000,000 drivers are
now using them. 25
cents a pair, postpaid.
Wholesale price \$1.50
per doz. pairs. Made
of the highest grade
imitation rubber, or
heavily nickeled over
copper.



Read's Rein Holder



REIN
HOLDER.

Holds reins in perfect position
on horse's neck and does not
allow them to slip under shaft.
50,000 sold in one month.

Send 25 cents for sample pair.
Wholesale price, \$1.50 per doz.
pairs.

Made of the highest grade
imitation rubber or heavily
nickeled over copper.

Read's Rein Fastener

They keep the reins away
from the horse's feet and hold
them behind whip out of the
way. 25c. each, postpaid.

Wholesale price, \$1.50 per doz.

Made of oil tempered spring
steel. Finished in imitation
rubber only.

Reins never under horse's tail
or hip strap ends. Reins never
under ends of shaft. Reins instantly secured,
when stepping from vehicle. 10,000 dealers
and blacksmiths handle them. Send \$4.50
for 3 dozen assorted and mounted on hand-
some display cards, and we will pay express
charges.



O. B. READ MFG. CO.,
Troy, N. Y.



Patent Applied For.
Buffalo Tire Upsetter, No. 1.

No 1. For bolting to post. Same upsets $1\frac{1}{2} \times \frac{1}{4}$ in. tires. Jaws open $\frac{3}{4}$ in. Takes as small as 7 in. circle. Same principle as No. 2, but without legs.

No. 2. Upsets flat or curved work. Does not kink or buckle. Upsets $3 \times \frac{3}{8}$ in. tires, or $1\frac{1}{2}$ in. axles. Weight 275 lbs. This is the size most widely used by blacksmiths. We make two other sizes, taking work up to $7 \times 1\frac{1}{4}$ in. Full details on application.

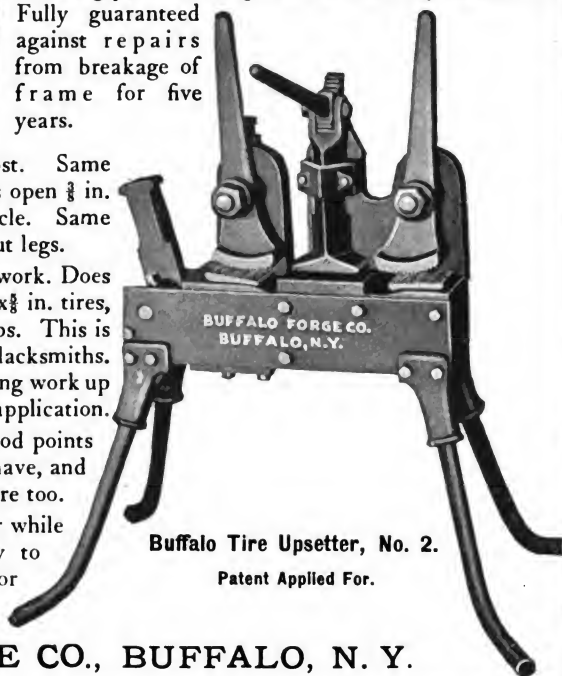
Test this machine for all good points a tire upsetter is supposed to have, and you will find them all, and more too.

We will make it worth your while to be the first in your county to order the No. 2 size. Write for full details.

BUFFALO FORGE CO., BUFFALO, N. Y.

BUFFALO TIRE UPSETTER 1905 DESIGN

Armor plate frame. The kind that don't break. Working parts of forged steel carefully machined. Fully guaranteed against repairs from breakage of frame for five years.



Buffalo Tire Upsetter, No. 2.

Patent Applied For.



"ALWAYS SHARP" CALKS
ARE THE BEST.
Interchangeable thread—6 sizes.
Marion, Ind., Jan. 20, 1905.
With 25 years' experience I consider your "Always Sharp" Calk the Best adjustable calk I have ever seen. Wallace Lettridge, Statistician Master Horseshoers Protective Association of Ind.
ALWAYS SHARP CALK CO.
Agents Wanted. SPRINGFIELD, MASS.

New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.



Write for circular and particulars.

942 W. Lake St. CHICAGO.

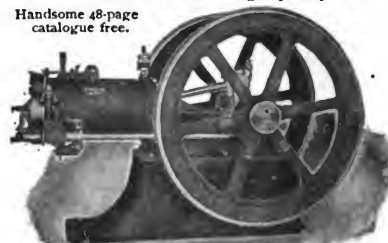
High Power at Low Cost

for fuel; quiet, smooth running, easy starting, the greatest reliability—that's what you get in

BADGER Gas and Gasoline ENGINES

Write at once for exclusive agency and prices.

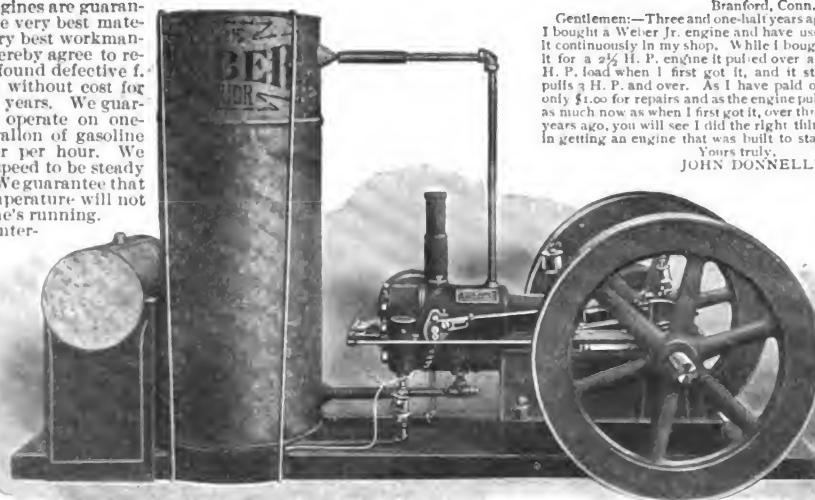
Handsome 48-page catalogue free.



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Every WEBER Engine a Standard of Quality

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WEBER JUNIOR, $2\frac{1}{2}$ H. P. Engine. It is shipped with all attachments complete, ready to run.

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Gentlemen:—Three and one-half years ago I bought a Weber Jr. engine and have used it continuously in my shop. While I bought it for a $2\frac{1}{2}$ H. P. engine it pulled over a 3 H. P. load when I first got it, and it still pulls a H. P. and over. As I have paid out only \$1.00 for repairs and as the engine pulls as much now as when I first got it, over three years ago, you will see I did the right thing in getting an engine that was built to stay.
Yours truly,
JOHN DONNELLY.

Huntington, Pa.
Gentlemen:—The Weber Jr. engine purchased from you over two years ago has given very best results. I use the engine to run a pony planer and circular saw and it takes the place of two men; so you can see what a money and labor saver it is. Every one should have a Weber Jr. and their labors would be lessened and their trouble would cease.
J. E. ISENBERG.

Dowagiac, Mich.
Gentlemen:—Over two years ago I bought one of your Weber Jr. engines and have never had occasion to write you since receiving the engine until now. I have given it a thorough test on all kinds of work and it is just as good now as when I bought it, but as I need another supply of hot tubes, I wish you would send me a dozen by mail.
Yours truly,
C. L. DOUGHERTY.

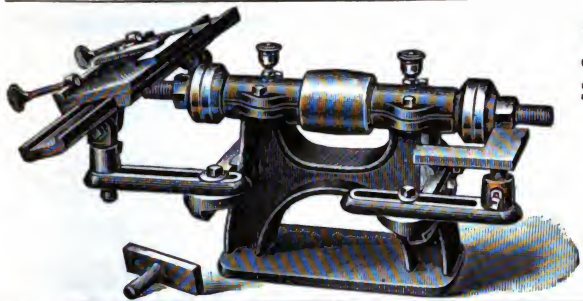
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Dear Sirs:—I have been running one of your Weber Jr. engines for over two years and it has given the very best of satisfaction. The engine runs a band saw, trip hammer, screw machine, blower, drill and emery wheel, and it will run any three of the above machines at the same time.
C. L. HUNT.

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Dear Sirs:—Our Weber Jr. engine has run our blacksmith shop for the past four seasons and is doing better than ever with absolutely no expense for repairs.
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Weber Gas and Gasoline Engine Co.

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Solid base made with rest arms that do not turn. We make other styles. Write for catalogue of tools and machinery.

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Janesville, Wis.

ACME Stationary Engines

For use where parties already have steam.
Licensed under the Westinghouse Patent.

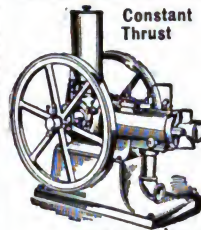
These stationary engines have automatic shaft governor that will control the speed to a variation of only 2½ per cent. from full load to no load. They will deliver their full rate of power on the belt with steam at boiler pressure of 80 lbs., and run with less jar and with less attention than any small engine built.

Built in Sizes ½, 1, 2, 3, 4, 5 and 8 H. P.

Built strong enough to stand working pressure of two hundred pounds of steam. These engines are especially adapted for small, independent equipments for yachts, steamships, search lights, office buildings, night service in hospitals, etc., etc. Catalogue sent upon application.

ROCHESTER MACHINE TOOL WORKS
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The MIETZ & WEISS Oil and Gas Engines



Constant Thrust

STATIONARY AND MARINE
1-60 H. P.

Adopted by the U. S. and Foreign Governments.

Most Economical and Safest Power known. Runs with common kerosene, distillate or fuel oils.

It will pay you to consult me before placing your order elsewhere.

For all Power Purposes.

Thousands in use.

Highest award for Direct Coupled Engine and Dynamo, Paris Exposition, 1900.

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A. MIETZ, 128-138 Mott St., New York
Send for Catalogue, Dep. 34.

A Paver's Success

THE ACCOUNTS of the rise of many of the students of the International Correspondence Schools, of Scranton, Pa., read like romance. These stories of success prove the superiority of the I. C. S. method of correspondence instruction.

When John W. Van Niede, of 320 S. Main St., Ephrata, Pa., enrolled in these Schools, he was a cement paver. Before fully completing his Course he obtained the position he now holds as superintendent of an electric light plant. He has also installed complete plants, making all specifications and drawings himself.

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Please send me the free booklet "1001 Stories of Success," and explain how I can qualify for position before which I have marked X below.

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Chemist	Architect
Sheet-Metal Draftsman	Bookkeeper
Sanitary Engineer	Stenographer
Electrician	Ad. Writer
Stationary Engineer	French } With
Marine Engineer	German } Edison
Civil Engineer	Spanish } Phonograph

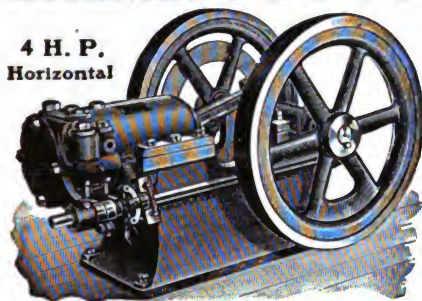
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St. & No. _____

City _____ State _____

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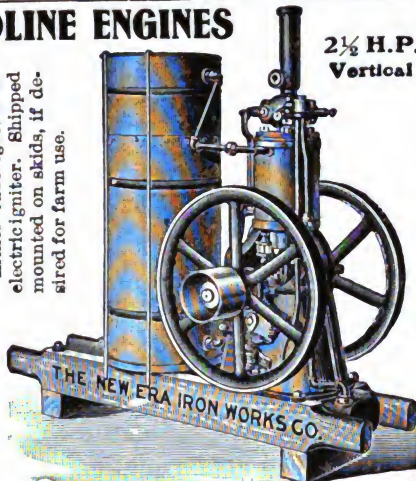
4 H. P.
Horizontal



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.

Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.



2½ H.P.
Vertical

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GET IMPORTANT FACTS Concerning kerosene, gas and gasoline engines. Get our information of some forty different makes of engines in the past eight years before you buy, or you will be sorry. Do not invest your good money in an engine that is weak in any of these points. We know where they're sick, we know where they're lame, we have repaired them. Get posted before you buy. Will give you free for the asking, information worth many dollars to you. If you are a blacksmith you can understand this.

WRITE TODAY.

**ENGINE REPAIRING AND
TESTING WORKS,**
8 to 14 Abbott St., Binghamton, N. Y.

Md. Phone, Courtland 2128. C. & P. Phone, Mt. Vernon, 3193.

R. MILTON NORRIS

Successor to C. T. & C. B. Mackenzie.

Carriage and Wagon Goods

Manufacturer of

**ROUGH WAGON POLES,
CART SHAFTS AND SILLS**

520 West Baltimore St., Baltimore, Md.
(Annex, 5 N. Diamond Street)

Agent for Skelly's Celebrated Norway Phila. Eagle Carriage Bolts.

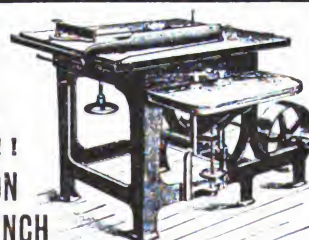
Steel and Cast Skeins. Iron and Steel.
WRITE FOR LOWEST PRICES.

\$60.00

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**ALL IRON
SAW BENCH**

With Boring Attachment



JUST THE THING for Carriage and Job Shops.
SEND FOR PARTICULARS.

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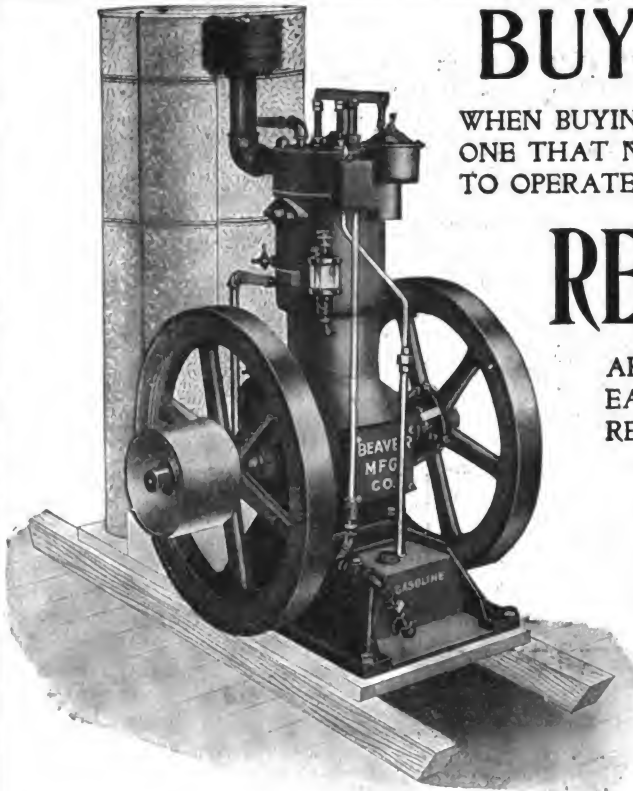
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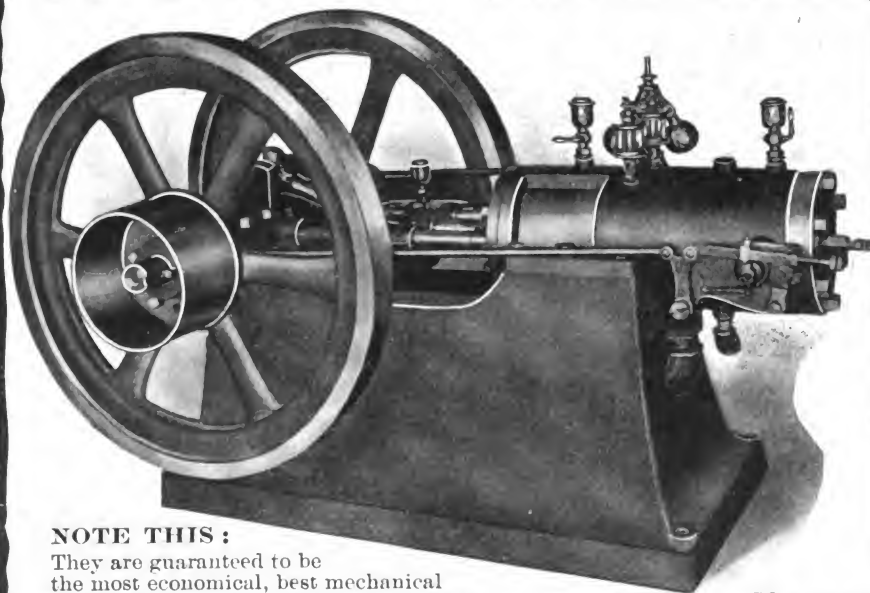
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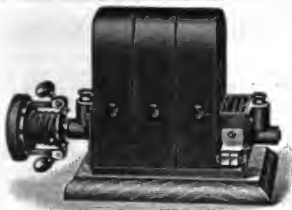
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GASOLINE
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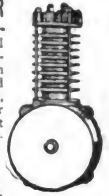
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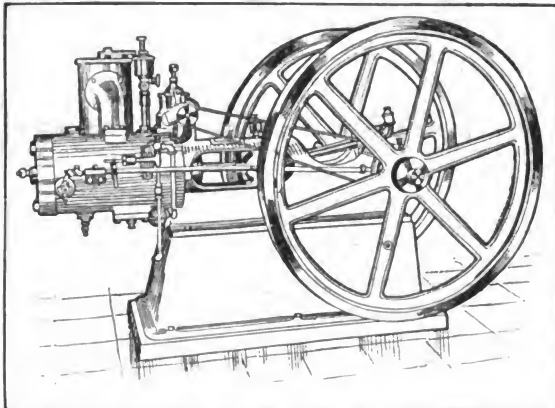
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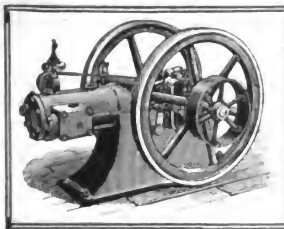
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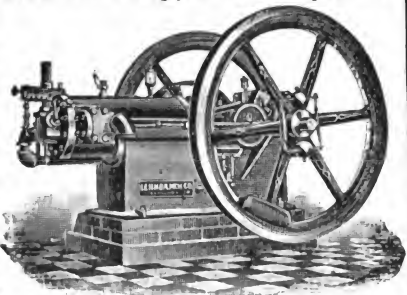
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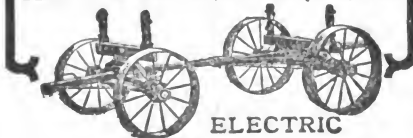
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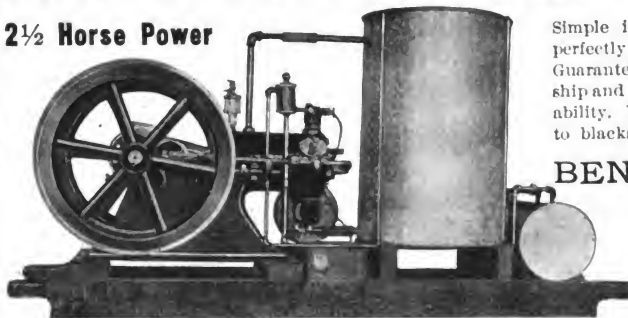
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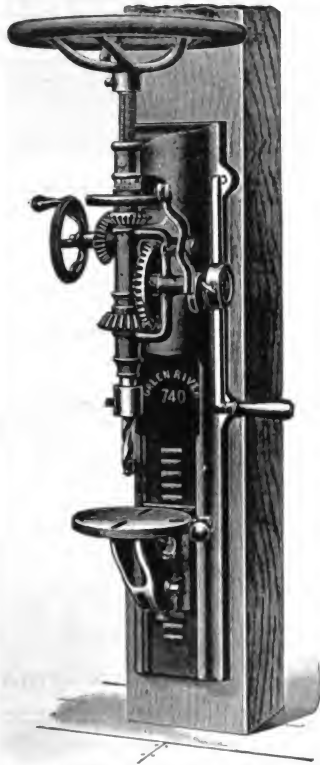


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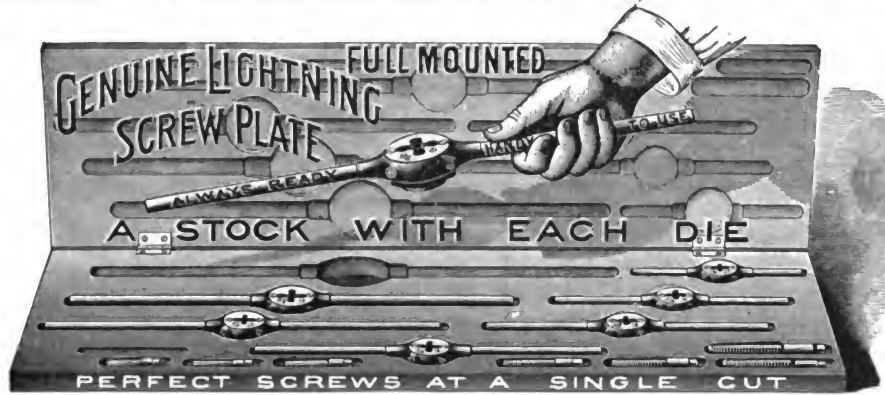
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Fig. 740



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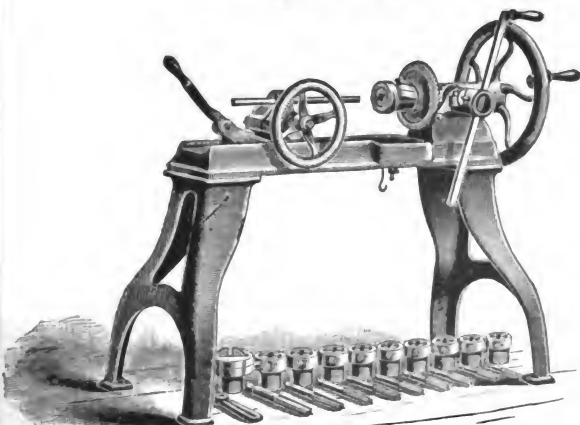
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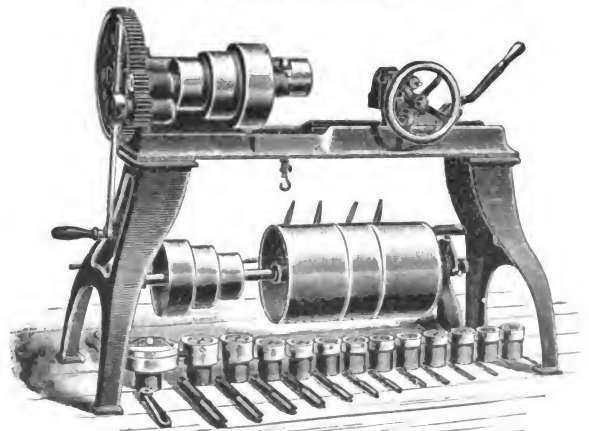
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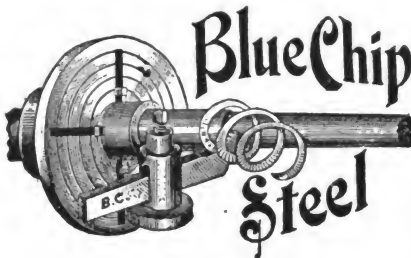
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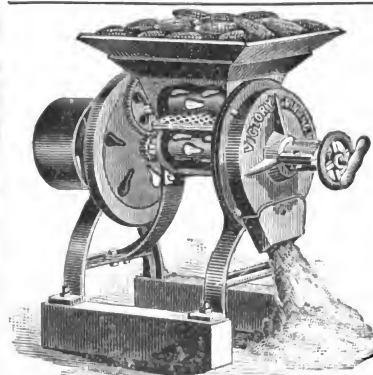
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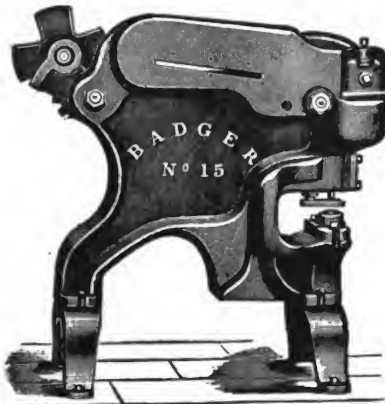
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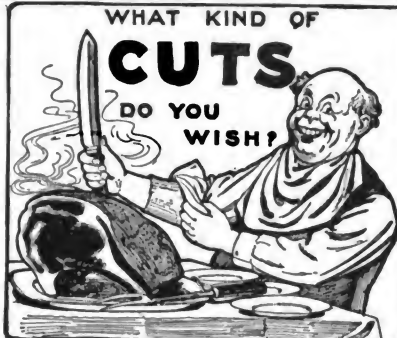


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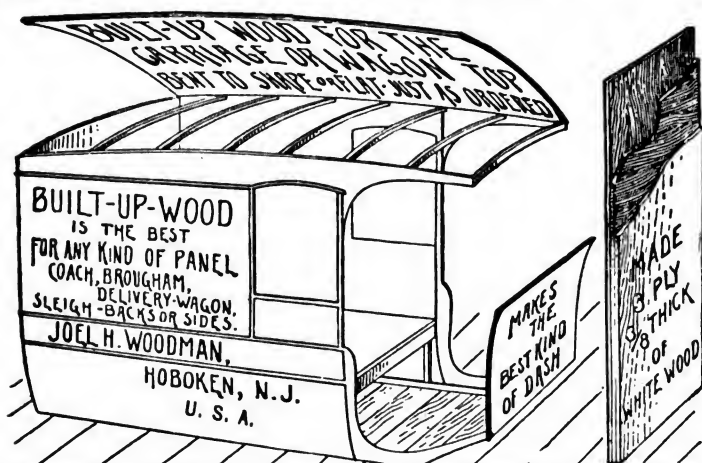


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The **PERFECT POWER HAMMER** is made in three sizes and is not only best adapted for plow and general job work, but has an attachment, as shown in cut below, for sharpening harrow and plow discs, found on no other hammer.

Simple, powerful and easy to operate—three leading properties of this hammer. Requires but 1 H. P. to run it. Height, 6 ft., 9 in.; floor space, 20 x 30 in. Write for prices and details.

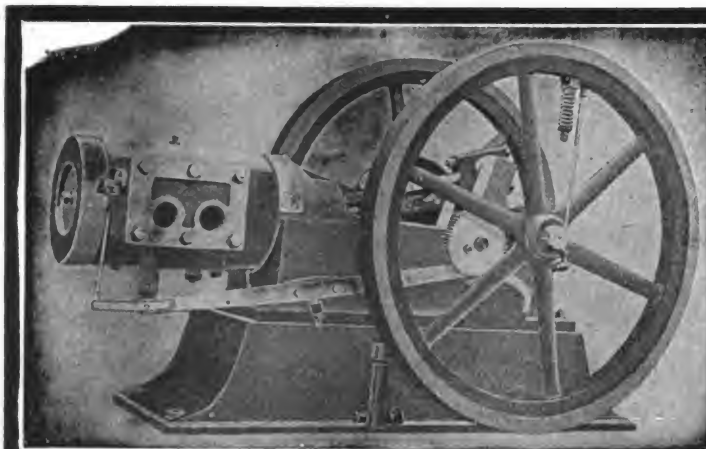
***We Guarantee the Best Material
and Workmanship, and will replace
any defective part free.***

Our broad guarantee holds good for one year and proves the quality of the hammers manufactured by this Company. Every blacksmith should have one. Price within reach of all.



MANUFACTURED BY

MACGOWAN & FINIGAN
Foundry and Machine Co.
ST. LOUIS, MO.



POWER IS WHAT
YOU WANT

WE HAVE IT

in the

DAVIS GASOLINE ENGINES

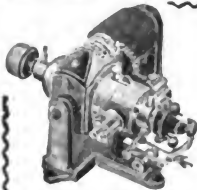
Write for Catalogue and Prices

Waterloo Motor Works

Waterloo, Iowa



DEATH TO HEAVES
Guaranteed
Newton's Heave, Cough, Dis-temper and Indigestion Cure. A veterinary specific for wind, throat and stomach troubles. Strong recommends. \$1 per can. Dealers, mail or Ex. paid. Newton Horse Remedy Co. (3) Toledo, Ohio.



To Gas Engine Operators.
Dynamo Ignition.

**Motsinger
Auto-Sparker**

No battery to start or run. The original speed-controlled friction-drive Dynamo. Driven parallel with engine shaft. No belts. No beveled pulley or beveled fly wheel necessary. For make and break and jump-spark system. Water and dust proof. FULLY GUARANTEED.

We have an attractive proposition for the Dealer in Gas Engine lines. Correspondence solicited.

Write for 32-page catalogue, FREE.

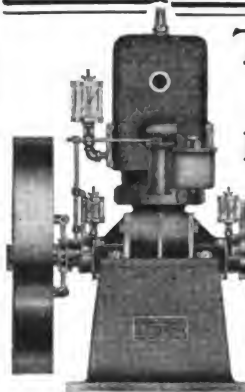
MOTSINGER DEVICE MANUFACTURING CO.
33 Main Street, Pendleton, Ind., U. S. A.

It's the
SPARK
that
COUNTS



YOUR ENGINE will work better, give you less trouble and carry a bigger load, if you ignite with one of our **Improved Mueller Spark Coils**. Furnished for use with batteries or dynamo. WE GUARANTEE our coils against all imperfections in workmanship and material. If your engine doesn't ignite properly, write us. Information cheerfully given. Correspondence solicited.

INDUCTION COIL CO.
9-10-11 MILLER BLDG. MILWAUKEE, WIS.



THE CUSHMAN MOTOR

widely known for its remarkable record in the marine field, is now offered as a general purpose

HIGH GRADE STATIONARY POWER

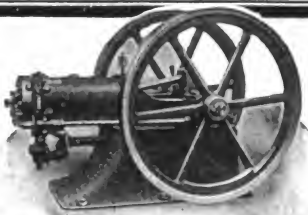
with our fullest confidence that it will not disappoint. It gives more power for its cost and weight with higher speed and greater steadiness with less attention than any other gas or gasoline motor. This 1905 model embodies all our latest improvements. The engine proper is valveless. The cylinder, water jacket and head are cast in one piece. It is simple all through. It is the ideal power for Blacksmith and small Machine shops. Made in 1, 2, 3 and 6 H. P. sizes.

Handsome Catalogue in press. Write now for full particulars.

Cushman Motor Co., 2028 N. St., Lincoln, Neb., U.S.A.

AGENTS WANTED
in all leading markets.

Member Nat'l. Assn.
Engine and Boat Mfrs.



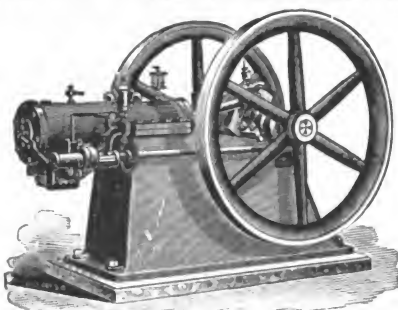
**THE ADVANCE ENGINE
FOR PROGRESSIVE SMITHS**

No better engine made—a model of perfection, which will stand the most rigid test and be found equal to every shop requirement. Write for our interesting catalogue.

GEORGE D. POHL MFG. CO. VERNON

**COLUMBUS GASOLINE
ENGINES**

ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33, Stating Horse Power
You Need.

COLUMBUS MACHINE COMPANY,
Columbus, Ohio.

OTTO ENGINES

Reliability First

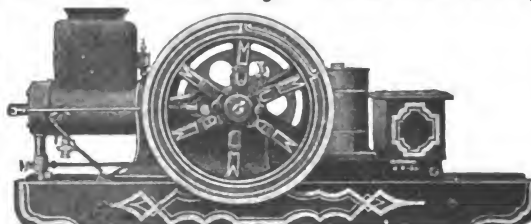
An engine, to gain and hold public confidence, **must be reliable**. It may have all the other good points under the sun, but if it won't run when you want it to, and continue to run till you stop it, it won't do.

The "Otto" is reliable—28 years of forging ahead proves it, 12,000 satisfied users affirm it and a company whose responsibility is unquestioned guarantees it.



OTTO GAS ENGINE WORKS, Phila, Pa.
STANDARD OF THE WORLD

The Easy Starting LAUSON



Is built for zero weather. It has no water tank and pipes to freeze up. Two pails of water is all that is required to keep the engine properly cooled. This feature and our improved generator valve make this an ideal engine for winter work. It will start as easy and work as well at 20 below zero as in summer.

Write for our 1905 catalog describing our line of stationary and portable Gasoline Engines from 2 to 20 H. P. We want Blacksmiths everywhere to act as agents.

5 H. P. Special.

THE JOHN LAUSON MFG. CO., NEW HOLSTEIN, WIS., U. S. A.

ROOTS'

Acme Hand Blower

For Blacksmiths

It has the unqualified
indorsement of
every mechanic who
has used it.



Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

Any smith can now renew the bronze bearings in the new Blower in a very few minutes.

Net price with box and connecting pipe for tuyere

\$15.50

Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
The Leader of Blowers for Blacksmiths.

P. H. & F. M. ROOTS CO.

New York Office:
120-122 Liberty Street

Connorsville, Indiana

Chicago Office:
1547 Marquette Building

STAR HACK SAWS



They cost a trifle more at the start, but are ten times the cheapest in the end. We repeat that it requires something more than steel, teeth and holes to constitute a Hack Saw Blade. You cannot buy a good hammer for 10 cents, or the best Hack Saw Blades at price of inferior goods.

Prominent Dealers

the world over sell



Blades

Every genuine blade

is stamped with a



SEND FOR CIRCULARS.

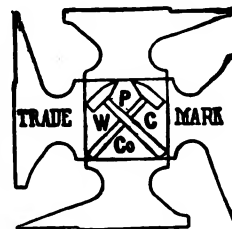
MENTION "AMERICAN BLACKSMITH."

Millers Falls Company, 28 Warren St.,
New York, N. Y.

YOU WILL NEVER FAIL

To Make a Strong, Clean Weld If You
Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

PRICE CONSISTENT WITH QUALITY.

PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

"Your 604 Forge with 66 Drill, free, for being the first in the county, at hand. They are all right. Now I am going to be the 'first in the county' man on some of the other offers as well. They are too good to miss.—MACK WADDEY, Franklin, Tenn."

Don't be a Tom Tardy on the offers we are making to place one each of the 1905 tools in each county. Have you inquired if anyone else is ahead of you in your county? If not, get busy.

BUFFALO FORGE COMPANY
BUFFALO, N. Y.



The
**Blacksmith's
Friends**



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

Welds at a low heat, does not fly. Saves time and fuel. **Guaranteed** to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the **Banner Brands**.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

INVESTIGATE The Hercules Hydraulic



Before
You
Buy a
Tire Setter

National Machine Co.
KEOKUK, IA.

WRITE FOR
THE

Tire Setter News

It will tell you
all about Henderson
Tire Setters.

Write for information
about our new HYDRAU-
LIC SIDE GRIP machine.
Illustration not out yet.



Standard Tire Setter Co.
KEOKUK, IA.

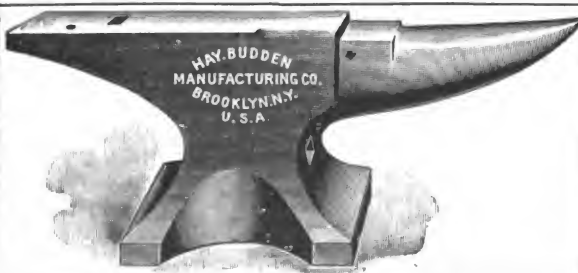
HAY-BUDDEN SOLID WROUGHT ANVILS

The Gold Medal Anvil
Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE
WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

VOLUME 4

THE

NUMBER 8

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

MAY, 1905

\$1⁰⁰ A YEAR
10⁰ A COPY



THE SCIENTIFIC HYDRAULIC EDGE GRIP TIRE SETTER

Marks a Great Advancement
in Cold Tire Setting

A NEW TIRE SETTER
Manufactured by an Old Company



Hydraulic power has always been considered most valuable, and when applied to a side grip tire setter, it makes a machine that works easier and quicker than any other side grip machine in existence

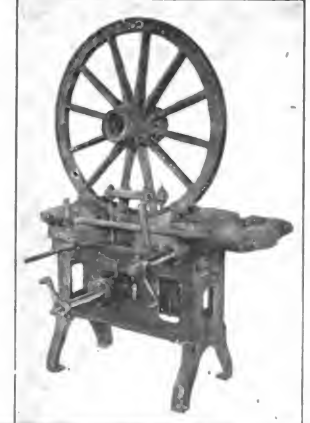
With this Machine the tire is first drawn tightly around the wheel, and then compressed within a space of ten inches instead of being bunched in one inch. The value of this principle can readily be seen

Write for Circulars
Giving Full Description
and Details

Special Privileges Given to First
Purchasers

STANDARD
TIRE SETTER COMPANY

KEOKUK, IOWA



CARRIAGE MAKER and BLACKSMITH TOOLS

THE "ELITE" BLOWER

is correctly manufactured
and is designed to
meet the demands of
hard service, together
with the greatest
possible efficiency,
durability
and convenience.

IT'S A
MONEY
MAKER.



Fig. 900, 12 inch.

Manufactured by

THE
SILVER MFG. CO.

365 BROADWAY
SALEM, OHIO
U. S. A.

THESE ARTICLES
ARE
GUARANTEED
AS
REPRESENTED.

Hub Boxing Machines, Spoke Tenon Machines, Band Saws, sizes 20, 26, 32 and 36 inch, Forges, and a complete line of hand and light Power Drills, a 19-inch Post Drill and a 20-inch Round or Square Base Drill with Lever or Screw Feed. The last two drills are used extensively by Carriage Builders and others.

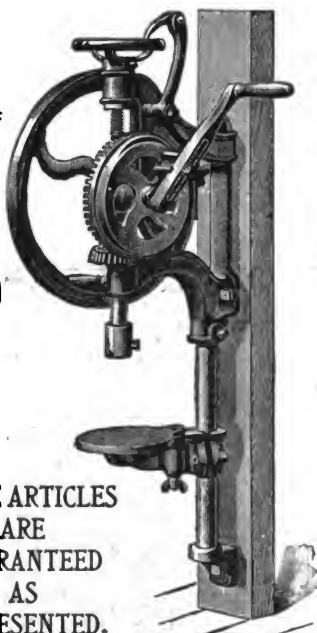


Fig. 731, No. 1.

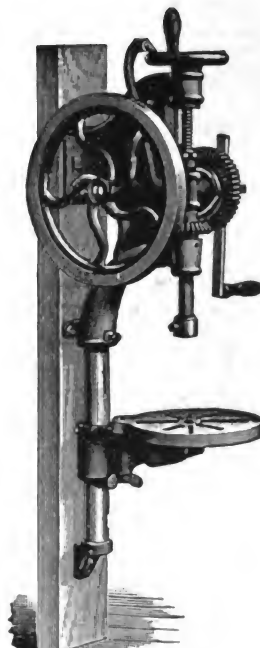


Fig. 742, No. 12.

Special prices are extended to Carriage Makers and Smiths
if this paper is mentioned.



Fig. 850, 20 inch.

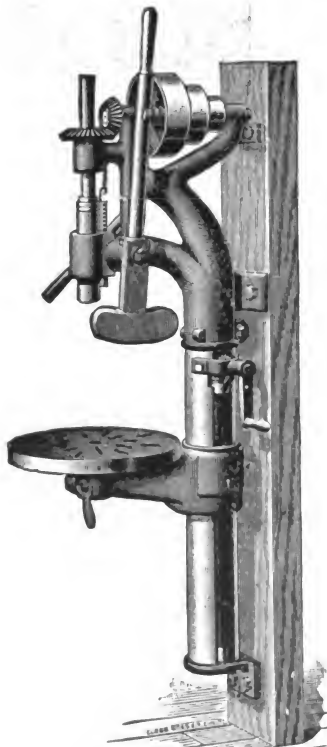


Fig. 727, 19 inch.

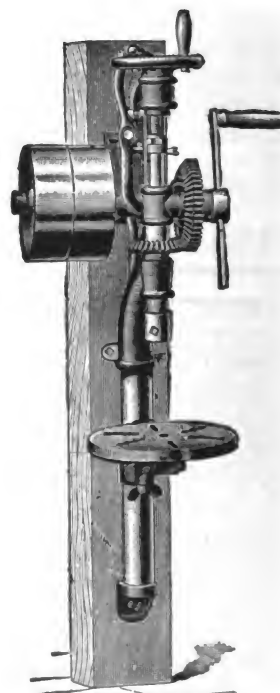


Fig. 746, No. 12.

You Will Save Big Money

By buying your Buggy Tops, Cushions, Backs, Sunshades, Everything in Seat Trimmings, direct from us.



No. 18 STICK SEAT

We manufacture in our own shop, with all modern equipments and skilled labor, the **finest Tops, Seat Trimmings, etc.**, ever put on the market. Get acquainted with **Our Leaders, Our No. 6 Top, Our No. 18 Stick Seat, Our New**

Boston Seat, and other new and attractive designs in Buggy Tops and Trimmings.

Made to order. Shipped promptly.

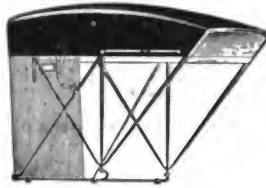
Our fine, new, 256-page complete line of Tops and Trim-

used by the up-to-date Black-

Let us send you this most

Let us send you samples of

A card will bring them both. Do it now, while you think of it.



No. 6 TOP

1905 Catalogue shows our mings, and besides, **everything** smith or Wagon Maker.

complete catalogue today.

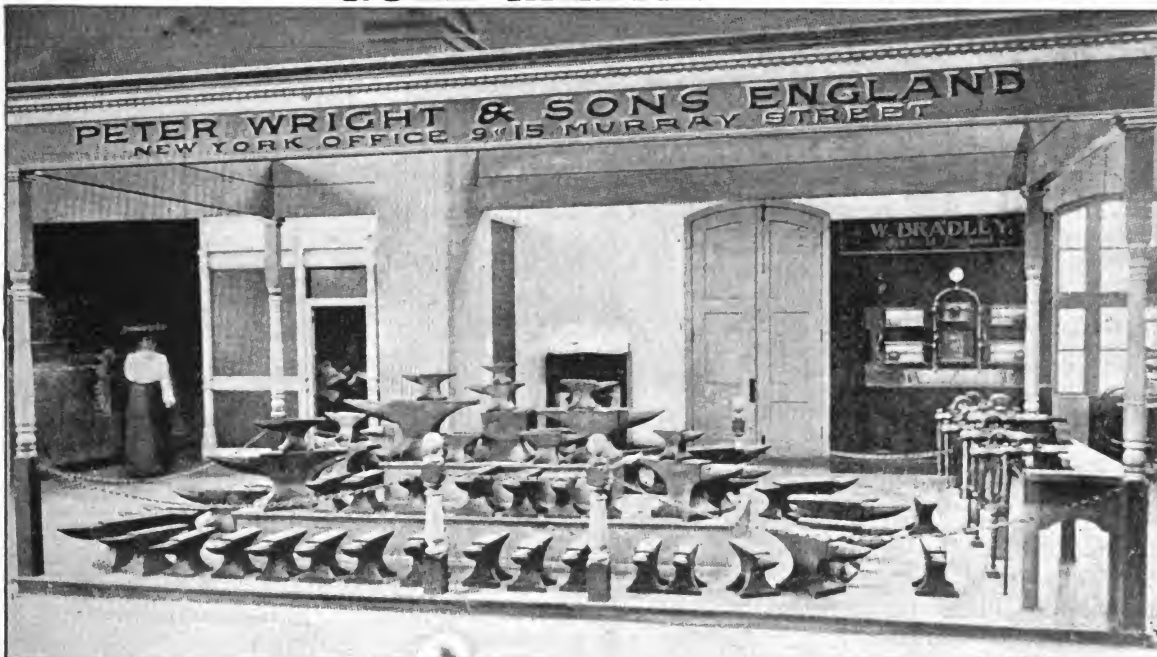
our Tops and Trimmings.

Address, **TRIMMING DEPARTMENT,**

CRAY BROTHERS, CLEVELAND, O.

PETER WRIGHT AND SONS ANVILS

RANK ABOVE ALL OTHERS. AT THE LOUISIANA PURCHASE EXPOSITION THEY WERE
AWARDED A "**GOLD MEDAL**" ON THEIR MERITS



OUR EXHIBIT AT ST. LOUIS, UPON WHICH WAS BESTOWED HIGHEST AWARDS BY THE EXPOSITION JURY

WIEBUSCH & HILGER, Ltd., 9-15 Murray Street, New York City.

Capewell Horse Nails

at the

World's Fair

GENERAL SERVICE COMPANY

(INCORPORATED)

AUTHORIZED AGENTS OF THE WORLD'S FAIR, ST. LOUIS, 1904

LOUISIANA PURCHASE EXPOSITION

St. Louis, U. S. A., Feb. 22, 1905.

THE CAPEWELL HORSE NAIL CO.,

Hartford Conn.

Gentlemen—We have used the Capewell Nail for the last seven years in the shops of the Columbia Transfer Company, of which I am President, and we have also used the Capewell Nail in the shops of this Company on all horses, some 450 in number, used in placing the exhibits and doing other teaming work during the World's Fair. It has given us excellent satisfaction and our smiths prefer it to any other nail on the market.

Yours very truly,

GENERAL SERVICE CO.,

J. M. ALLEN, Vice-President and General Mgr.

MADE BY

THE CAPEWELL HORSE NAIL COMPANY

HARTFORD, CONN.

The Largest Manufacturers of Horseshoe Nails in the World

BRANCHES

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ST. LOUIS: 12-14 NORTH 12TH ST.
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1905 Calendar and Complete Catalogue Free on Application

A Good Machine is Known by its Work

THE WEST TIRE SETTER CO.,
ROCHESTER, N. Y.,

HOOVERTON, PA.,
March 4th, '04.

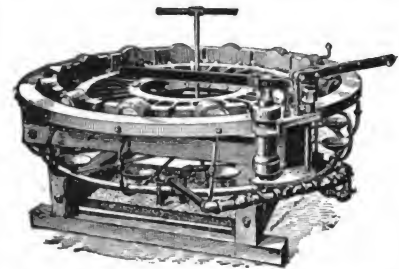
DEAR SIR:—

I thought I would write and let you know how I like the Tire Setter (Hydraulic Junior Hand Machine). Would say I have hooped medium, light and heavy wheels and channel tires. These were all repair wheels, and some of the rims of the wheels were flat in places, and it did the work PERFECT and far beyond my expectations. I do hereby give you the privilege of using my name in any way, shape or form in regards to your Setter.

In the contract I was to pay you \$250.00 April 1st, but will send you check for the amount about the 17th of this month. Please send me some circulars of the Hand machine as I know of others wanting one.

Thanking you for past favors, I remain,

Yours truly,
JOSEPH D. WOLF.



**A WEST TIRE SETTER
BEATS THE OLD METHOD**

Because It
**SAVES TIME
SAVES SPACE
DOES BETTER WORK
DOES IT QUICKER
IS ALWAYS READY**

For Price and Particulars, Address

The West Tire Setter Company, Rochester, N. Y.



WILL SHEAR:
1/2 x 4" flat iron
bars, 1" round
iron bars.

WILL PUNCH:
1/2" hole through
3/4" round plate,
also punch to the
center of 12 inches

Weights
600 lbs.

New Badger COMBINED Punch and Shear

The body of these machines are cast in one piece. All shafts, pins and king bolts being made of steel. The mandrel which holds the punch is made square to avoid turning and spoiling the dies when square or irregular shape punches are being used.

Hand lever works toward the back of machine in both cutting and punching.

**Badger State Machine Co.,
JANESVILLE, WISCONSIN.**

THIS MACHINE

**Will Apply All Kinds of
Solid Rubber Tires and
Finish Them With-
out change**



Will put on
rubber tire
from
3/4 inch up to 2 1/2
inches, using
bands, one wire,
two wires, or out-
side wires with-
out change. One
man operates the
machine. No
helper. We can
put on 20 set of 3/4
wheels a day.

**GUARANTEED TO
DO A QUICKER
AND BETTER JOB
THAN ANY OTHER
MACHINE ON THE
MARKET.**

**Buy
the Best**

When You Buy

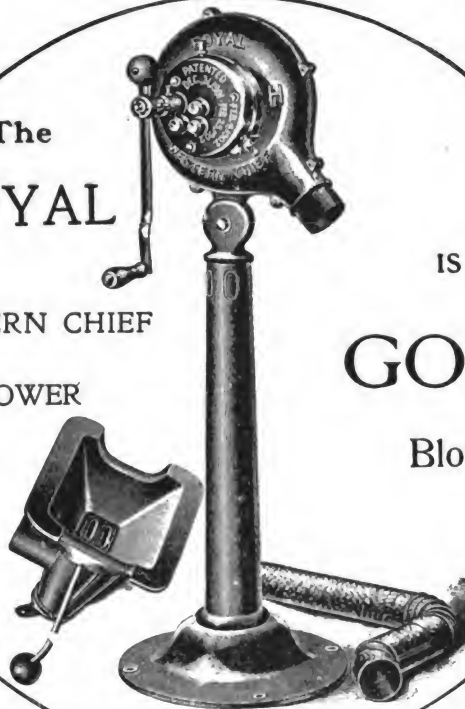
**Burlington Rubber Tire Machine Co.
BURLINGTON, IOWA.**

THREE GOOD THINGS

"ASK THE DEALER."

The
ROYAL
WESTERN CHIEF
BLOWER

IS A
GOOD
Blower



ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.
Gears and Boxes are phosphor bronze and steel.
No spiral or worm gears.
Fan, 12 inches. Weight 100 lbs.
Fire-pot measures 9x11½x4 in. inside.

No. 14 DRILL.

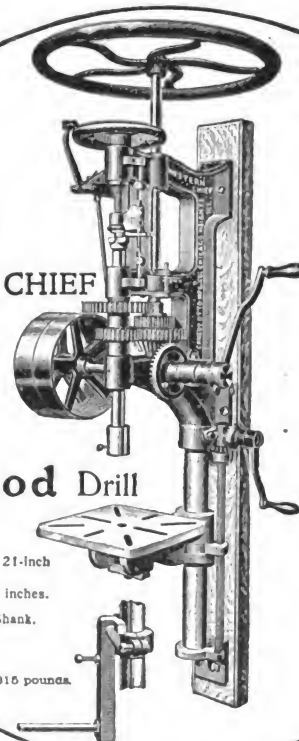
This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.

THE
WESTERN CHIEF
DRILL

No. 14
Is a Good Drill

Drills to center of 21-Inch Circle.
Bores from 0 to 1½ inches.
Takes Bits ½ or ¾ Shank.

Weight, 315 pounds.



It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table

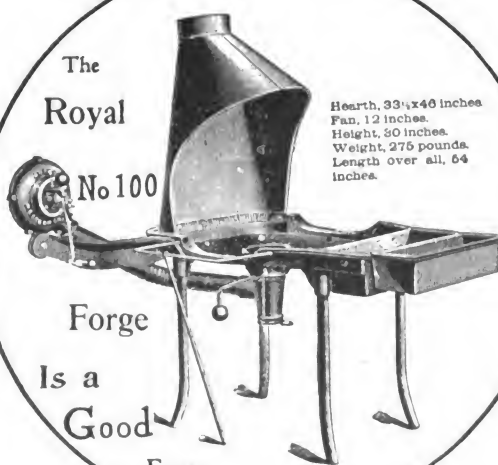
The
Royal

No. 100

Forge

Is a
Good

Forge



Hearth, 33½x46 inches
Fan, 12 inches.
Height, 80 inches.
Weight, 275 pounds.
Length over all, 64 inches.

No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★

PROFITABLE WORK

— FOR —

EVERY BLACKSMITH BRAZING CAST IRON



With our compound "Brazit" any blacksmith can successfully braze all broken castings saving the expense of a new casting and the expensive delay of waiting for it.

THOUSANDS OF DOLLARS

are lost daily because of broken castings. The expense of replacing these castings is immense. Much money is lost because of machines lying idle waiting for broken parts to be replaced. You can prevent these large losses by

Mending Castings and make a big profit for yourself. For instance, suppose a gear wheel breaks. It may cost fifteen or twenty dollars for a new one, and the mill would have to lie idle for perhaps a week before the new one arrived. By means of a few cents' worth of **Brazit**, however, you can repair the wheel stronger than new and make as much **Brazit Will Do It.** It will successfully braze cast iron, braze cast money in an hour as you often make in days iron to wrought iron or weld steel to cast iron.

With Brazit you can successfully mend broken parts of machinery, agricultural implements, tools of all description, gears, windmills pumps, engines, automobile parts, sewing machines, lawn mowers, pulleys, stoves, printing presses, and anything made of cast iron.

Our compound opens up a profitable line of work for every blacksmith. You invest practically nothing and the profits are big. You do not require special equipment, as the work is done in your forge. Wide-awake blacksmiths all over the country are taking up this work.

We want every blacksmith and repairman to try **Brazit**, because once they find out how easy it is to work, and what snug profits it makes, they will always keep a supply on hand.

In order to get you started with this profitable line of work we make the following liberal offer.

We will send pre-paid a complete sample working set for

\$1.00

This set is sufficient to braze a large number of pieces. The directions are simple and complete.

REGULAR WORKING SETS--A Complete outfit with plain directions, \$5.00

A trial of **Brazit** is the best way we know of for proving to you it will do as claimed. We want you to try it. You can do a big and profitable business mending all the broken castings in the neighborhood.

U. S. BRAZING COMPOUND COMPANY

113-115 SO. SECOND ST.

INCORPORATED.

NEW BEDFORD, MASS.

Read These Testimonials

SHARON, S. C.
I received the trial set of "Brazit" and can say it beats anything I ever saw. It does just as claimed. I broke a piece of cast iron and put it together and it was stronger than before, so you can use my name if you choose. I will order a complete outfit before very long.
C. P. LOWRENCE.

NEW BEDFORD, MASS.
This is to certify that I have had a number of pieces of cast iron machinery mended with "Brazit" which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.
WILLARD N. LANE.

WESTFIELD, MASS.
We acknowledge the receipt of your favor of March 4th, together with sample of "Brazit" which we have tried and found satisfactory.
POPE MANUFACTURING CO.

SOUTH DARTMOUTH, MASS.
I have used your compound and it worked O. K. Wish I had had some of it before.
THEODORE BRIGHTMAN.

★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★ BRAZIT ★



BUY THE BEST

Ask your dealer to show you

THE TRENTON

"It rings like a bell"

Manufactured by **THE COLUMBUS FORGE & IRON CO.,** Columbus, O.

Sole Sale Agent **HERMANN BOKER & COMPANY,**
101 Duane Street, New York City.

AN AXLE

*Which is coming into favor
again is here illustrated, the*



**Stivers —
Long Swell**

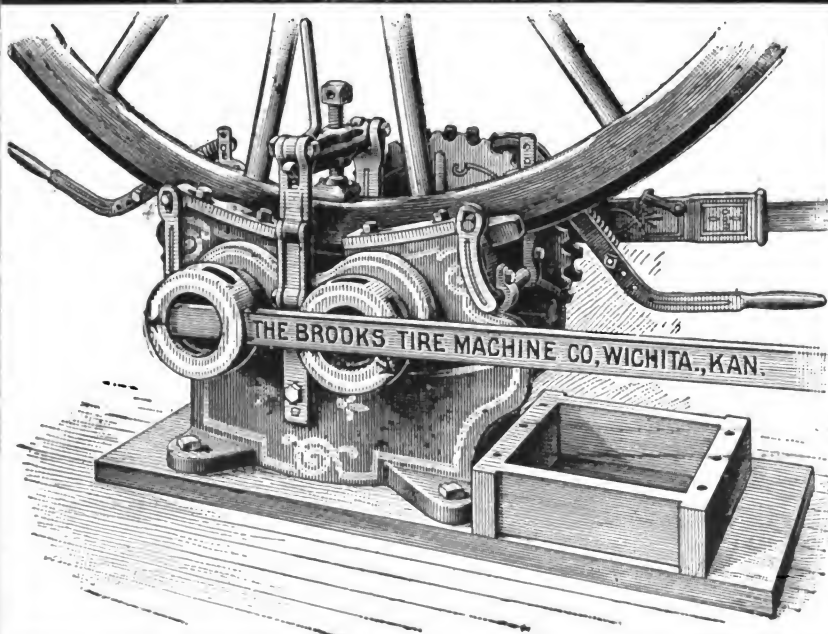
We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

*If you wish further particulars
Write to the*

DALZELL AXLE CO.,

South Egremont, Mass.

The Highest Medal or Award of Merit



Awarded to any Cold Tire
Setter exhibited at the Louis-
iana Purchase Exposition was
awarded to the

**Brooks Cold
Tire Setter**

The Experts of the Jury of Awards
were convinced by the actual operation
of the machine that **there is none better**
and that is what our customers say.

They do the work more rapidly, with
more satisfactory results and are the
most durable.

Many are ordering now under our
special winter terms.

Write for these terms and complete
catalogue and testimonials.

THE BROOKS TIRE MACHINE CO.

121 N. WATER STREET, WICHITA, KANSAS

1905 BUFFALO DRILL

*With ball bearings
where they count.*

What use are ball bearings if they are *not* in the RIGHT PLACE? We put them where the friction and wear come—*between the drill spindle and the feed screw*. No brass nuts to wear loose. They're under the fly-wheel, too. Made from tool steel, glass hardened, ground and polished. Back gears thrown in without the use of tools. Automatic hand and lever feed. For hand or power use.

Write for full description and prices to the
BUFFALO FORGE CO.
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Alaska Welding Coal is put through a chemical process, which gives it the greatest welding qualities of any coal ever put on the market, and once you use it you will never be without it. It is the cheapest and best coal ever used by a blacksmith. One sack of Alaska Welding Coal, mixed with any poor quality of Blacksmith's coal, will do more and better work than any compound known to the trade. You can weld all kinds of high steel, with perfect ease. It welds iron or steel to malleable castings. It will weld pieces of malleable castings as firmly as if they were never broken. You can weld spring steel as easily as two pieces of iron. It toughens poor, brittle iron; your fire never gets dirty, and is fit for welding at any time. We particularly recommend the use of Alaska Welding for heavy welding, in fact all work in a blacksmith's shop down to the shoeing of horses. It does away with the using of all welding compounds, and is the most economical fuel on the market. Buy coal of a cheaper grade and mix with the Alaska Welding Coal. It will go farther and do more work than any other coal now in use. Why pay six and a half to seven and a half (\$6.50-\$7.50) dollars for coal when Alaska Welding Coal does more and costs less. Save time and labor and money by using it. It makes the purest and cleanest fire, requiring little attention. Two handfuls sprinkled over your fire will be sufficient to do the most difficult welding job that comes into your shop.

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We feel justified in saying that Alaska Welding Coal is the wonder of the age. It is wonderful the different kinds of metal this coal will unite.

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PATENT APPLIED FOR.

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OFFICE OF MANUFACTURERS

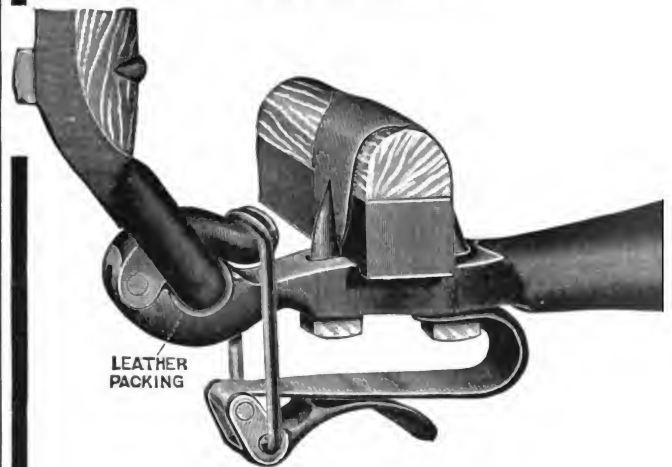
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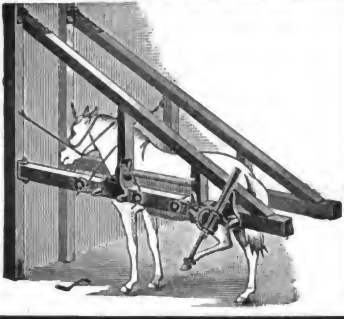


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These Couplings are made entirely of STEEL, have been thoroughly tested, are warranted in every particular, and have the well-known BRADLEY quality. Orders can be filled same day received. We solicit your favors.

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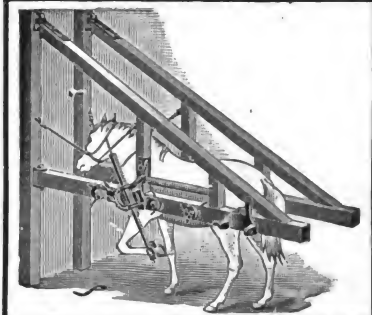
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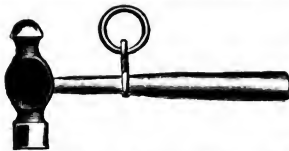
2. We offer as a premium a two line rubber stamp, with your name and address on it, accompanied with an inking pad, making a complete outfit. You will find use for it every day.



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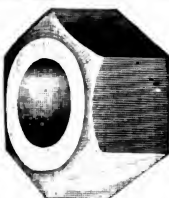


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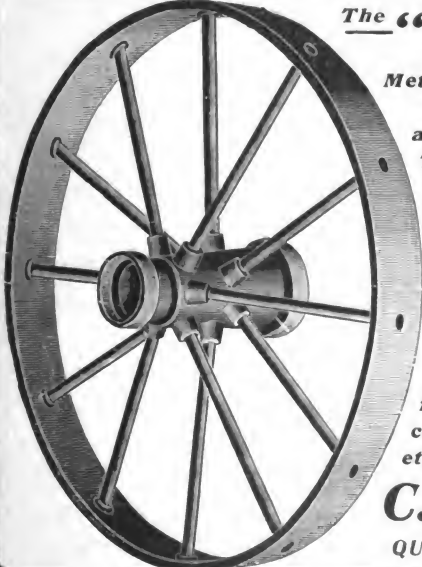
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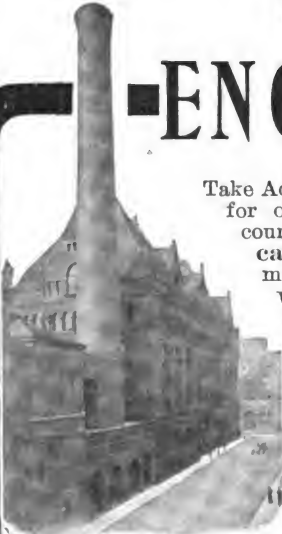
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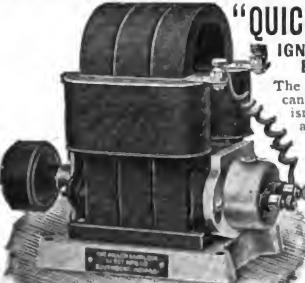
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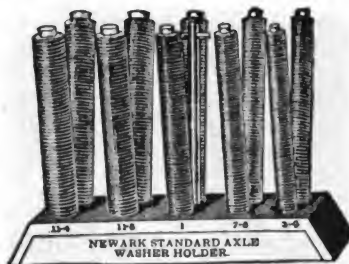


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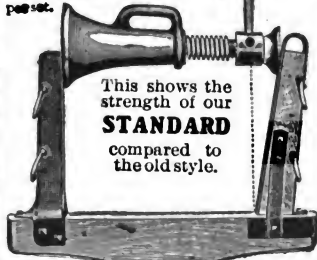
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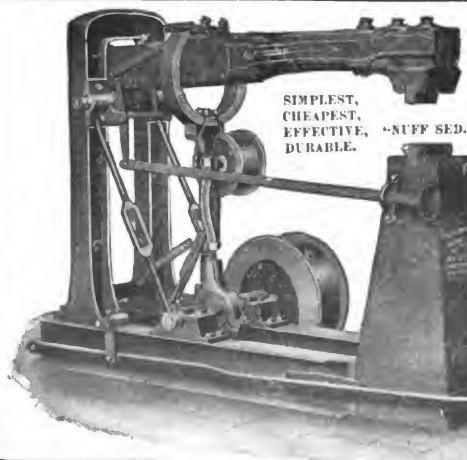
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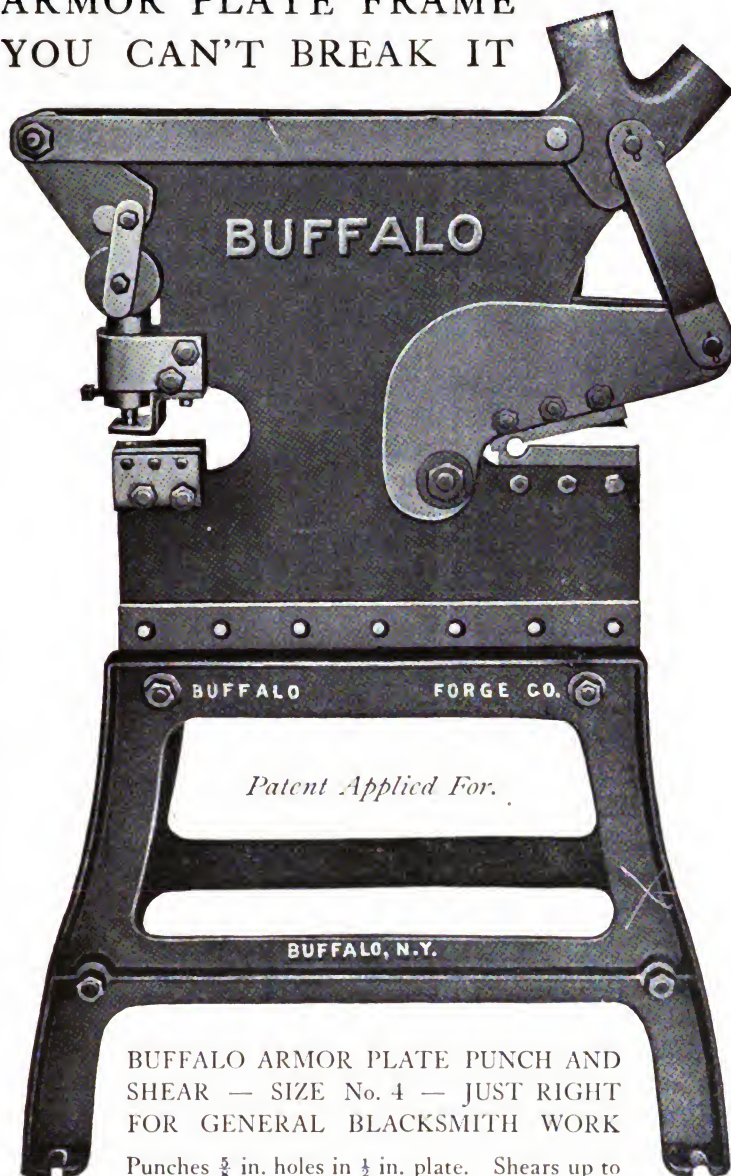
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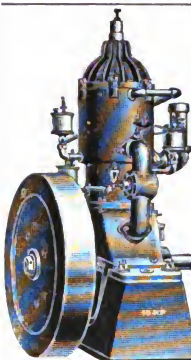


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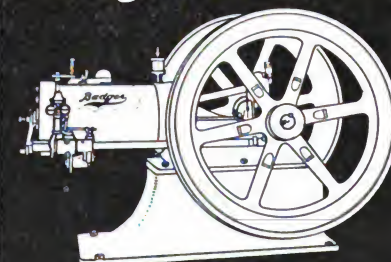
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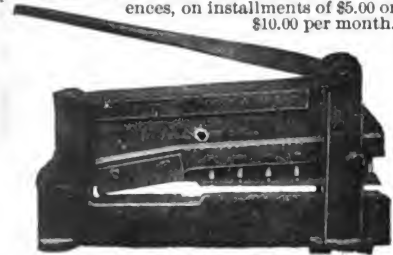
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Should be in every progressive Smith's hands Bound very neatly in green cloth. Price, 50c. AMERICAN BLACKSMITH COMPANY, Buffalo, N. Y.

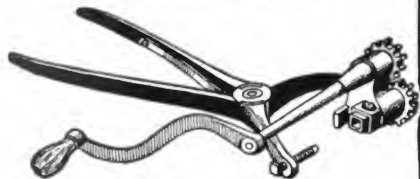
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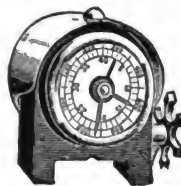


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For Carpenters, Wagon Builders, Cabinet Makers and Wood Workers Generally.

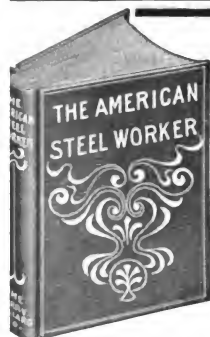
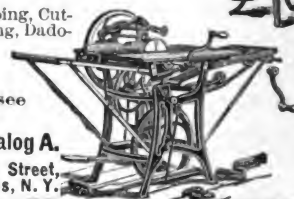
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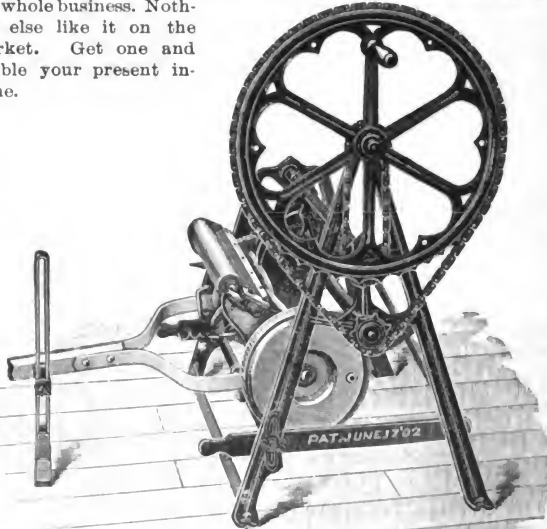
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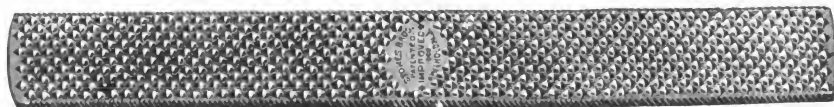
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We make no charge for this service.
Drop us a postal.

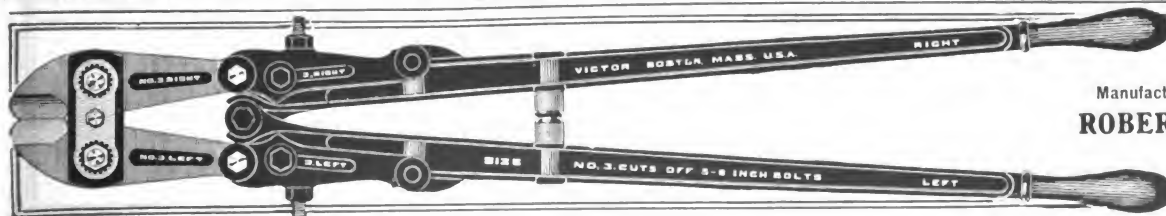
The American Blacksmith
BUFFALO

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From small beginning in 1883 this Rasp has built up the largest rasp business on earth—*Solely by merit.*

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SOLD CHEAP

Manufactured under Patent by
ROBERTS MFG. CO.
Somerville,
Mass.

Buffalo No. 200

BUILT ON MODERN MECHANICAL

Blower

PRINCIPLES

These are cut spur or helical gears, with broad, heavy teeth. They are not spiral gears which cause friction and soon wear out. They are not spiral gears which get out of alignment, the objectionable feature of all spiral geared blowers. (Ask your brother smith, who has the spiral kind, how many repair bills he has already paid, and will have to pay within five years). Any part of the Buffalo No. 200 or 201 blower wearing out in five years will be replaced free of all charge.

See guarantee bond, next page.

Note the large proportions of these gears.

They are mounted on a heavy cast iron frame, entirely independent of the case.

They are in a straight line and must run true. Frame prevents any possibility of their getting out of alignment.

The entire mechanism is self-contained. Remove the gear case and the gears run the same as before.

The case serves merely to keep out the dust and furnish the oil bath.

These gears are as accurately cut as those on the finest machine tools.

There are no brass boxes to wear out.

The cold-rolled polished steel shafts run in extra long bearings bored and reamed in the solid casting.

The gears run in an oil bath, insuring perfect lubrication for months without attention.

An air-tight, dust-proof case protects the gears and keeps out all dust and grit.

This is the only blower where the casing is adjustable for any desired angle of discharge of blast.

An air meter, or anemometer test shows that this blower delivers more air with less power than any other blower in the world.

Here is how they write about the No. 200 and No. 201 blowers:

CASHION, OKLA.
BUFFALO FORGE CO.

GENTLEMEN:—It has been about a month since I received the No. 200 blower. I have been trying it thoroughly and would say that is the best blower I ever saw. I have tried all the other kinds from first to last, and in my estimation the No. 200 blower is the only one fit for a blacksmith fire. I have a power blower with a switch and blast gate connected to the same fire. The No. 200 does so much better than the power blower that I have to partly close the blast gate."

Yours truly, L. H. BURCHETT.

These are the only blowers in the world covered by an unlimited guarantee for five years. See top of opposite page. These blowers will be placed in your shop on free trial before paying a cent, and taken away without expense to you if you are not satisfied. See your dealer, or write direct.

SPECIAL OFFER.—If you mention THE AMERICAN BLACKSMITH, and are the first in your county to order one of these blowers, we will send you free your choice of a No. 1 Tire Upsetter, or No. 111 Tuiere. Both described on this page.

**BUFFALO
FORGE
Co.**

BUFFALO, N. Y.

No. 201 right or left hand blower. Turn the crank either way. This blower does not deliver quite so much air as the standard scroll fan casing used in the No. 200.

Cut shows standard scroll fan casing, which delivers more air per revolution than any other blower in the world.

Offered free to first buyer in each county, with No. 200 or 201 Buffalo blower, provided you mention AMERICAN BLACKSMITH.

Armor plate frame. Unbreakable; light; strong. Upsets bands and tires $1\frac{1}{2} \times \frac{1}{4}$ in. Fastens to post. We make several other sizes and styles.

Buffalo Tire Upsetter No. 1



Buffalo No. 111 Improved Side and Center Blast Tuiere. Three blasts: right, left and center. Complete control of fire. Will not burn out. No clay lining. Offered free with No. 200 or 201 hand blowers to first purchaser in each county, provided he mentions THE AMERICAN BLACKSMITH.

Buffalo No. 200 Geared Hand Blower, right hand. Also left hand. Delivers more air with less power than any other blower in the world.



Buffalo, N. Y., 190.....

Guarantee Certificate.

Be it known to every purchaser of a Buffalo Steel Plate Forge, No. 600 Series, also to every buyer of a No. 200 Buffalo Geared Blower, that these machines are hereby guaranteed against cost of repairs due to wear, for five years from date of this certificate. Any parts wearing out within five years will be replaced free of charge, f. o. b. cars Buffalo. Mention the date of this certificate and the style of Machine.

The Buffalo Geared Blower, No. 200 Series, is also guaranteed to outwear any other on the market, to produce a stronger blast with the same number of turns of the crank per minute, and with less power than any other hand blower built. Run these machines 24 hours per day if you want to, this guarantee holds.

BUFFALO FORGE COMPANY,

W. F. Mudd President.

Buffalo, N. Y., U. S. A.

Facsimile of
Guarantee Certificate
sent with each sale,
duly dated, and bear-
ing Buffalo Forge
Company's seal.



Buffalo Steel Plate Forge No. 604.

The first all steel forge was a Buffalo, and No. 604 is the pacemaker

PATENT APPLIED FOR.

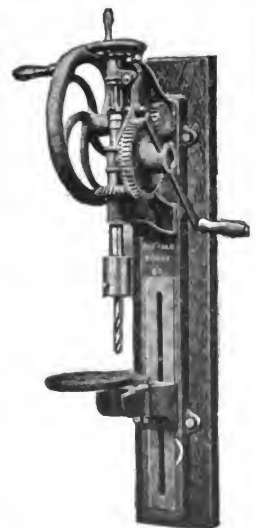
Thoroughly reinforced and braced; practically indestructible. Light, compact, rigid, self-contained. The most powerful blower ever fitted to a forge, combined with an improved tuyere and roomy hearth, give it a capacity far in excess of any portable forge built. Blower is enclosed in dust-proof case, and the gears run in oil. The smoothness of operation astonishes every blacksmith. We stake our reputation on the wearing qualities of this forge. Any repairs due to wear occurring in five years furnished free. See above guarantee. Placed on free trial in your own shop before paying a cent.

**Special Offer to
First Purchasers
in each County**

With the first purchase of a Buffalo Steel Plate Forge No. 604 in each County will be given free a No. 66 or 68 Buffalo Drill. Drill is a standard machine 37 inches

long and weighing 100 lbs. No. 68 is same as No. 66, but has wood back instead of iron. Drills 1 inch hole to centre 15 inch circle. Run of feed $3\frac{1}{4}$ inches. This offer applies to first in the county purchasers only. Be prompt. Don't let some one else get ahead of you. It will pay you. Other styles and sizes as well as the famous lever type hand geared Portable Forges in the new catalogue. Send for it.

BUFFALO STEEL PLATE FORGE No. 604
Patent Applied For

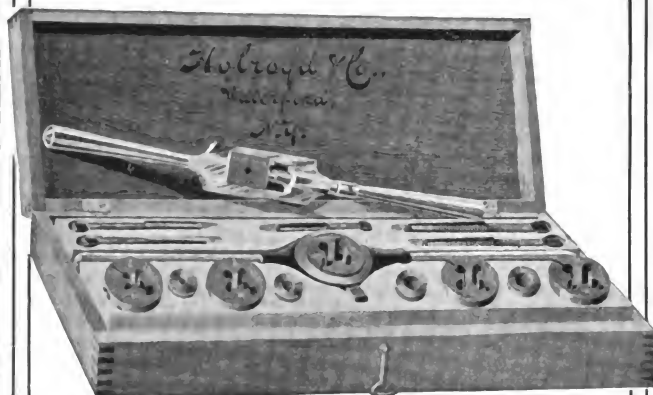


BUFFALO HAND
DRILL No. 66

Given free to first purchaser in each County of a No. 604 Forge

BUFFALO FORGE COMPANY, BUFFALO, NEW YORK.

Established 1847

"THE HOUSE OF HOLROYD"

Manufacturers of the Most Perfect Screw Plates,
Taps and Dies Attainable. Our Modern Appli-
cances are Noted for their Accuracy and Quality.

HOLROYD & CO.
WATERFORD, N. Y.

**"CHICAGO" EMERY WHEELS
CUT QUICK.**

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.

"CHICAGO" WHEELS save time.

They're made of stuff that cuts.

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Glue, Emery,

Polishing Wheels,

Grinding Machinery.

Made by

Chicago Wheel & Mfg. Co.

42 W. RANDOLPH ST.

CHICAGO, U. S. A.

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MODERN POWER HAMMER

**FOR BLACKSMITHS
AND
IRON WORKERS**

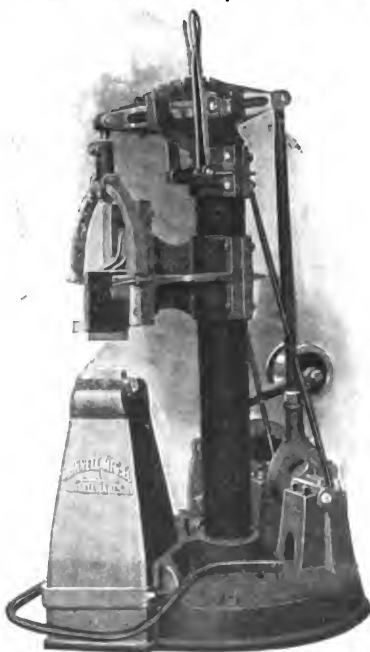
Height, 5 Feet 3 Inches.
Floor Space, 32x42 Inches.
Weight, 1400 Lbs.
Power Required, 1 to 2
Horse Power.

Length of stroke changed instantly while running. The only hammer made that will strike a very light blow at full speed. All others slow down to get a light blow.

The "Modern" gives you any blow you want at any speed: hand lever controls the force of blow, foot treadle controls the speed.

Long planed guides adjustable for wear. Cast steel hammer adjustable up and down to suit the thickness of stock. Tool steel dies.

Greater range of work than any other hammer.



Manufactured and Fully Guaranteed

GRINNELL MFG. CO.
GRINNELL, IOWA

An Introduction

the big book says, is the act of acquainting or making known. It should not be simply a "Glad to know you," but the beginning of a true and lasting friendship. Usually a mutually intimate friend does this service, one who perceives that the two parties should know each other.

The Introducer

of the buyer to the seller in this case is The American Blacksmith. It is the mutually intimate friend who discriminates against unreliable, undesirable advertisers, and brings together in trade friendship good buyers and good sellers.

¶ If you are a buyer, turn to our advertising columns for an introduction to the sellers.

¶ If you are a seller, use our advertising columns to introduce you to the buyers.

Twenty-five thousand of the world's best smiths are reading The American Blacksmith. Our ad rates are right.

The American Blacksmith Co.

P. O. Drawer 974, BUFFALO, N. Y.

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

MAY, 1905

NUMBER 8

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Duly entered as second-class mail matter, at Buffalo, N. Y. Act of Congress, March 3, 1879.

Never too Late to Learn.

Suppose that a recognized authority on some branch of the craft in which you are especially interested should call at your shop for a friendly discussion upon shop topics. If you could spare an hour's time, would you not appreciate and enjoy the visit? But did it ever occur to you that numbers of authors are in daily readiness to hold just such a chat with you? Experience, it is true, is the best teacher. The most useful knowledge a smith can obtain is that gained by practical work. But add to this the information to be found in a few good books on your work and you will find yourself a much more efficient and valuable craftsman.

The large number of new books on blacksmithing subjects recently published, indicate a growing interest in works of this kind, and it is a pleasure to note the increasing demand of craftsmen for publications of merit in their line. It means that the smith is anxious to broaden his knowledge, and this is another sign of the advancement of the good old smithing craft.

The value of any book, of course, depends entirely upon the author's ability. It should be the plainly written talk of a

man having years of experience with the subject under consideration. When we consider that some authorities offer the entire fruits of their life learning through the works they have written, the value of books is apparent. Some of our greatest men gained their entire education by reading. However, it is not book knowledge alone, but the combination of another man's ideas with your own practical knowledge that gives best results.

Whether it be shoeing or the working of steel, the majority of our friends have a "specialty" and while we believe that it is best for a man to concentrate his energies upon one thing and to do that one thing well, still there is no reason why the up-to-date smith should not be able to handle every job which comes to the shop, and the greatest aid towards this end is the treasure of information concealed behind the covers of good, practical craft books.

We have on file catalogues of the leading publishers of mechanical and technical books. Our readers should feel free at all times to consult us regarding special books they may wish to secure.

A Fair Deal and a Square Deal.

At the present season, when the busy smith is considering the purchase of new tools and improved shop machinery, we feel impelled to again call attention to a certain paragraph which appears in our columns each month. We have reference to "Honest Dealings," in which we state, "Our readers are our friends, and their interests will be protected."

Thousands of AMERICAN BLACKSMITH subscribers buy their complete equipment from AMERICAN BLACKSMITH advertisers. We are very careful that every firm whose announcement appears in our columns is a trustworthy, reliable concern, a representative firm in their line. Our readers know this, and naturally feel sure of getting value received in all dealing with our advertisers.

Blacksmith and wagonmaker will find advertised in our columns a complete line of all products pertaining to their trade. These are the only kind of advertisements we accept. No patent

medicine, gold mine or catch-penny schemes will ever be found there. Both the reading pages and the ad pages are for our subscribers. We aim to publish nothing which will not be of direct interest to them.

The "Honest Dealings" paragraph monthly reminds our readers that we guarantee subscribers against loss from any advertisers who prove to be deliberate swindlers. But in spite of these reminders, it is interesting to know that we have never found it necessary to make good a single loss. But if any of our advertisers fail to give a reader a fair, square deal, we want to know it, and to know it quickly. We cannot, of course, be expected to concern ourselves with petty misunderstandings, complaints about delays in shipment and the like.

Recently we furnished our subscribers with a supply of pink Buffalo stamps, which when attached to their letters give notice that they are backed by our influence. In all dealings with AMERICAN BLACKSMITH advertisers, we will consider it a special favor if you mention our journal, or affix a pink Buffalo stamp to your letter, which is another way of saying the same thing. When your supply of stamps is exhausted, drop us a postal for a fresh lot.

A Series of Articles on Vehicle Painting.

Having in mind the many requests of our readers, we have arranged with Mr. M. C. Hillick for a series of articles on the painting of vehicles. The first of these appeared in our April number. We here announce their continuation and their scope as follows:

Mr. Hillick's name is not a new one to many of our subscribers, for he has contributed several interesting articles to THE AMERICAN BLACKSMITH. He holds a very prominent position among the vehicle painters of this country, being probably the best known of them. Several books on painting have been written by Mr. Hillick, one of the most popular of which is his "Practical Carriage and Wagon Painting." His articles are brimming with practical information

and valuable lessons drawn from years of experience. Written in his particularly graceful style, they are most pleasing to read and instructive.

We trust our friends will find the present series of articles even more attractive and useful than the preceding contributions of Mr. Hillick.

Rambling Discourse on Steam Engines.

The force which acts to drive a steam engine is the pressure of the steam as generated in a boiler and admitted alternately in front and behind the piston in the cylinder of the engine. As is well known, steam of the same pressure as the atmosphere is generated when the temperature of water is raised to 212 degrees Fahrenheit. By confining water in a closed receptacle or boiler and applying heat, steam at a higher pressure can be obtained. For instance, if the water is raised to a temperature of about 338

degrees Fahrenheit, the pressure of the atmosphere, which is equivalent to fifteen pounds to the square inch. In condensing engines a vacuum pump is used to reduce the air pressure against which the engine works, down to, say, three or four pounds per square inch, resulting in a gain in work which the engine is able to do. In other larger types of engines, the steam in its way from the boiler to the condensers is passed through two, three or even four cylinders, and expanded that many different times in order to utilize as much as possible of the expansive force of the vapor. These various processes are all for the purpose of securing a greater economy in the use of the steam, that is, obtaining the greatest possible work from a given amount of it. In spite of all of these refinements, however, the very largest and finest steam engines and boiler plants of today do not convert into

many persons of keeping their engine cylinder so cool that the cylinder jacket feels only slightly warm to the hand, is incorrect, especially so far as fuel consumption and power development is concerned. The cooler an engine cylinder is kept the more of the explosive heat is taken up by the cylinder walls and radiated through them and the water. Much of this same heat could be turned into power instead of wasting, if the water were allowed to run away from the water space at a temperature of about 165 degrees Fahrenheit. Therefore it is to the advantage of the owners of gasoline engines to run them what may be called *quite hot*. If a good grade of lubricating oil is used it is surprising how hot the cylinder can be and yet operate successfully. And in this connection I might say that a high fire test oil, light in color and quite thin, instead of thick and heavy, makes the best gas engine cylinder oil.



EXTERIOR VIEW OF HACKLEY MANUAL TRAINING SCHOOL AT MUSKEGON, MICHIGAN.

degrees Fahrenheit in a closed receptacle, it gives off steam of about 100 pounds pressure to the square inch.

In the operation of steam engines, the cylinder is open to the boiler for a certain fraction of the stroke, practically the full boiler pressure acting to drive the piston forward. After the piston has traveled a fraction of the distance on its way, the valve cuts off the admission of the steam, after which the steam already admitted to the cylinder drives the piston the balance of the stroke by its own expansive force, the pressure falling as it does so. The more steam admitted to the cylinder, the greater amount of work would the engine do, and in the type known as the automatic cut-off engine, the governor controls its power by automatically cutting off the steam earlier or later in the stroke, so that whether the engine is called upon to do more or less work, the speed is kept practically constant.

Most steam engines are of the non-condensing type, or in other words, the en-

usable work more than ten or twelve per cent. of the energy originally contained in the coal. We are apt to think of this age as a most marvelous one mechanically, but such considerations as the above serve to show us that there still remains something to be accomplished. To know how to save the other seven-eighths of the energy of the coal which now goes to waste is a burning problem, indeed, and one of special importance in view of the comparatively early exhaustion of the available coal supply.

The Gas Engine.—8.

E. W. LONGANECKER.
Insufficient Cooling.

A thing that many blacksmiths encounter with the gas engine is the fact that it gets too hot while running. This is generally caused by some obstruction either in the water space around the chamber or in the pipe leading the water to and from the engine. If hydrant water is used for cooling purposes, the cylinder is often kept too cool to be the most economical. The practice with

Thick steam engine oil, full of carbon, will not do for gas engine cylinders. It causes a carbon deposit in the explosive chamber and in the grooves of the piston rings and soon clogs them so that they become ineffective. But insufficient cooling may cause so high a temperature as to ignite the lubricating oil. Usually the first thing that attracts the attention to this condition is the issue of smoke from the open end of the cylinder. Sometimes a coughing or barking noise is heard first which usually indicates a dry piston and is generally accompanied with a gust of smoke at each bark or impulse. If the circulation of the water is examined at such a time it will be found generally very limited and the water coming from the engine has probably reached the boiling point. The cause of the trouble should be looked for at once after shutting down the engine. The trouble may be in having allowed the water in the cooling tank to get too low, and it requires much heat to

raise the water in the pipes above and carry it back into the tank.

In all cases where cooling tanks are used, the water should never be allowed to get more than an inch below the mouth of the overflow or return pipe. This will always insure a free and easy circulation where there is no other obstruction. But where a heavy load is on the engine for the greater part of the time, it is better to use a circulating pump in the lower pipe between the tank and the engine so that a forced circulation may be had. A little rotary pump driven from the line shaft is an excellent outfit for the purpose. I have known in a number of instances of boiling hot water, rapidly and forcibly circulated, to

on account of the intense heat to which it was subjected. If the igniting end of the cylinder and exhaust valve show undue heat when compared with the middle portion of the cylinder, lime should be suspected and looked for and if found, removed. If rain water can be gotten to supply the cooling tank, the lime deposit can be avoided.

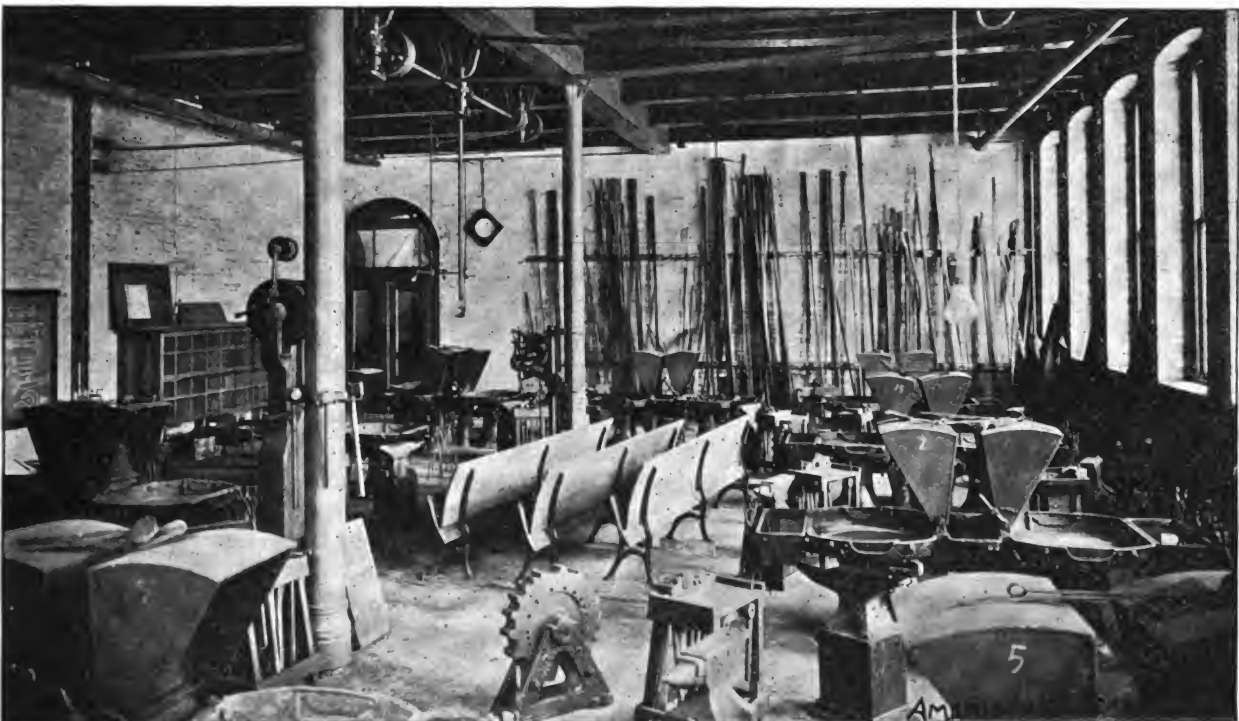
The Hackley Manual Training School.

WALTER HANSON.

The Hackley Manual Training School at Muskegon, Michigan, is a magnificent building having all the facilities to carry on the work of manual training in the highest degree. It was founded by the late Charles H. Hackley, in October,

train the boys and girls to use their hands and heads, think and act, do things. It develops the individual and helps him in a judicious selection of a vocation and offers great opportunities to the students who wish to enter higher technical schools or colleges. When the boy or girl has not the means of furthering his or her work in school, they have a sufficient knowledge of practical mechanic and domestic arts to make them more successful men and women. Manual training is required of all high school pupils as a part of their regular work.

The first year boys are given instruction in wood work. As soon as the pupil becomes familiar with tools and can do fairly good work he takes up elementary



INTERIOR VIEW OF THE FORGE ROOM AT HACKLEY MANUAL TRAINING SCHOOL.

keep the cylinder from overheating. The forced circulation uses the entire bulk over many times an hour. This brings it in contact with the air and cooling surfaces often.

One of the principle obstructions met with is lime deposit in the water space, and sometimes in the pipe. It occurs mostly in the water space immediately around the igniting or exploding chamber, and around the exhaust valves if it is jacketed and watered. Here the water space often becomes entirely occluded with lime deposit before anything serious is suspected, and as the water can not circulate through and around this part of the cylinder and valve, damage, by fire cracking, is done. I have known many an exhaust valve seat to crack, making the valve useless

1895. The following inscription taken from the cornerstone explains the purpose of the school. "Wherein the boys and girls of Muskegon may receive free of charge such instruction as is afforded in manual training schools of the best class."

The school as it stands at the present time cost over \$220,000, and has an endowment fund of \$610,000, all of which was given through the liberality of Mr. Hackley. Prof. E. A. Bending, a graduate from the engineering department of the University of Florida, is the director of the school. He is a man of wide experience in manual training and educational work and is known throughout the country for the good work he is doing in the educational field.

The aim of the school is primarily to

cabinet making. In all cases they draw their own designs, which are corrected by the instructor, and make such articles as are found to be the most useful in the home and for the school.

The first half of the second year is devoted to wood turning and the second half to pattern making. There are two shops for this department, one is equipped with ten lathes, a circular saw, two band saws, one surface planer, a buss planer, benches, vises, etc. The other room contains twenty-five wood turning lathes with the necessary equipment and tools. The pattern making section accommodates twenty pupils. Patterns for complete lathes, steam engines, parts of machines, etc., are made. The boys are also given practical instruction in foundry practice. The

equipment consists of a two-ton cupola, brass furnace, core oven and the usual foundry tools. This department supplies the machine shop with all the castings. Visits to local foundries are also made during the year.

Forging follows wood turning and pattern making. In this department the boys make the lathes and tools that are used solely by them in the machine shop, also their own blacksmith tools. They are given instruction in bending, punching, upsetting, drawing, tapering and shaping and then design and make such

shaper, a planer, one speed lathe, a power saw, a drill press, a drill grinder, one emery wheel, a grind stone and a boring machine.

Electricity and surveying are taken up by the students of the fifth year. This completes the course in the mechanic arts department. Mechanical drawing is required of all the boys during the entire course. A library containing the latest books on manual training and technical work is used by the students as a study and reference room and lectures are given in all the departments throughout the year.

In addition to the Hackley Manual Training School, Mr. Hackley has given Muskegon a gymnasium, where the boys and girls are given such exercises as will give them strength and grace, and keep the body in a healthy condition. He has also given a public library which contains 100,000 volumes, a hospital, a park, statues and an athletic field, all of which with the endowments make a total of \$4,164,525.

A Short Talk on Side-lines.

FRANK WENKE.

My side-line is veterinary surgery, i. e. doctoring horses, mules, cows and now and then a dog. This has brought me a good many dollars. Any one may do it. By reading and learning something about anatomy, physiology, and medicine, a man may get a good understanding about the domestic animals. The com-

mon ailments of our farm animals are easily treated. The treatment in most cases is nothing more than first aid to the injured and sick. Nature generally does the rest. It is not an infringement upon the duties of the veterinary surgeon, but rather a great help to our customers, who do not have to go for miles after the horse doctor only to find him not at home. It is a great aid to the blacksmith, meaning a good many dollars in his pocket. What owner of animals will not most willingly pay the blacksmith, whom he always finds at home, to help his horse over a spell of colic or some sprain or mix up a good linament or fix up a pill? A blacksmith of course should not advertise himself as a doctor, but should tell people that he knows enough to render first aid. A

little knowledge and a little modesty go a good way with our customers.

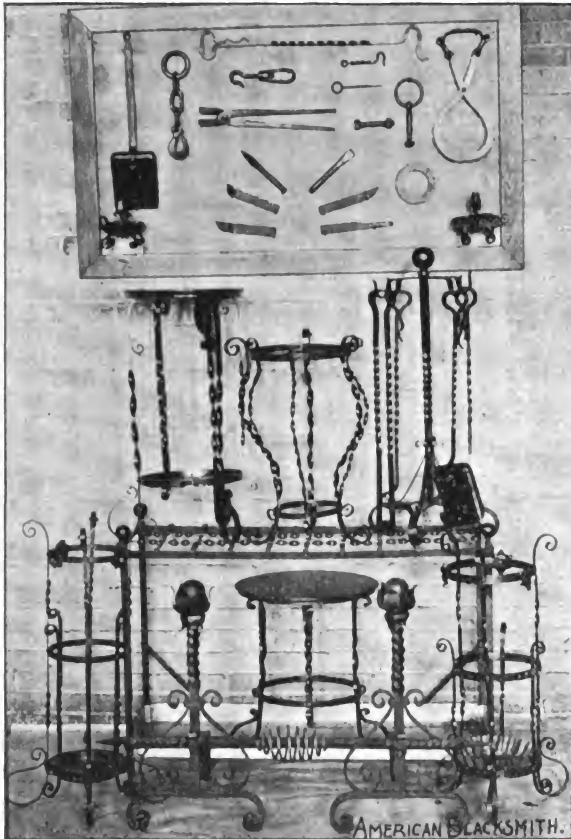
My Experience With Power in the Shop.

H. N. POPE.

My first experience of shop life began in Waterbury, Connecticut, at what is known as "Benzine Corners." There my father conducted a small repair shop without power. I remember well the block and hand ax with which he shaped out axle beds and other work before using the drawing knife. From this place we moved into a larger shop in a nearby town, and it was here that I first became acquainted with power. The shop was run by a high, narrow, over-shot water wheel which gave power for several saws, a tennoning machine and other woodworking machines, but nothing for the blacksmith. After leaving this place we located in two towns, in one of which we had power. Going to a nearby town, we found an old mill. Building a good addition onto this, we had quite a large factory. The blacksmith shop contained seven fires. In this place we had good water power running several saws, planers, and drills for the wood-working department, and drill presses, emery wheels, sand belt and a machine for boxing wheels were in the blacksmith department. In this place we remained for twenty-five years, the firm then going out of business. We then secured a shop in the City of Bridgeport, but soon found the shop too small and very inconvenient without power. So we removed to a larger place. By this time we had become so accustomed to power that we missed it very much and so finally purchased an Otto gas engine. This was a handy, inexpensive machine, always ready to do our bidding and to use it well was all it required. We used it to run all the wood-working department machines as well as drills, etc., for the blacksmith department. Sickness called a halt after thirteen years of labor in this place, but the last that I knew of the engine it was doing good work. Judging from experience I have had with and without power, I say every time—have power in your shop.

As to the kind of power, I should say get the kind that is most suited to your place; steam or electricity if you want a continuous power. The latter is the cleaner and more convenient power but perhaps costs more. Electricity is not obtainable in many small places where power is needed, so this brings us to the gas or gasoline engine.

In my experience with gas engines, I have made up my mind that there are several points that must be observed if



WORK EXECUTED BY THE THIRD YEAR STUDENTS AT HACKLEY SCHOOL.

articles as chains, tongs, hooks, hammers, wrought hinges, andirons, umbrella racks, etc. The forge shop is well equipped and contains twenty down draught forges.

Machine construction is given to the fourth year boys. The castings that have been made in the foundry are machined and finished. They are at the present time working on wood lathes. Each boy is given some particular part to finish and therefore it requires the best workmanship from every pupil in order that the lathe may be properly constructed. A gas engine is also being made here and will be installed in a launch that the instructor, with the assistance of the boys, is building. The machine shop is equipped with nine engine lathes, one milling machine, a

one wishes for success in using them. First, absolute cleanliness must be observed. Then there are a few don'ts that cannot be ignored, such as, don't forget the water on a cold night; don't use poor oil because it is cheaper than good; don't smoke or allow any one else to do so, near the engine. If it is convenient to put a house over the engine to keep out dust and inquisitive people, do so, as it will prolong the life of your engine. Take good care of it and it will

hammer them when too cold. I always heat to a bright cherry red and then the metal will not crack and when first subjected to necessary straining it will not break. I have noticed another error and that is the kind of oil, and whether fresh or old, and how to care for the oil. These points I know are very detrimental in tempering. Raw or boiled linseed oil or lubricating lard oil is the best for tempering. All oils should be kept in large open mouth jars, glass or earthenware and never

the sills. The drop, as well as the sides, are $4\frac{1}{2}$ by 1-inch white wood and are screwed to the inside of the sills at the front. The front and back bars of the well are checked into these side pieces. Select for the panels and slats the best figured white wood obtainable. Glue the panels to the sills and back bar. The standards should be of red oak and are $1\frac{1}{2}$ by $\frac{3}{4}$ -inch. These are bolted through the sills and seat rails, which are on the top of the panels and inside. Fig. 6 is a

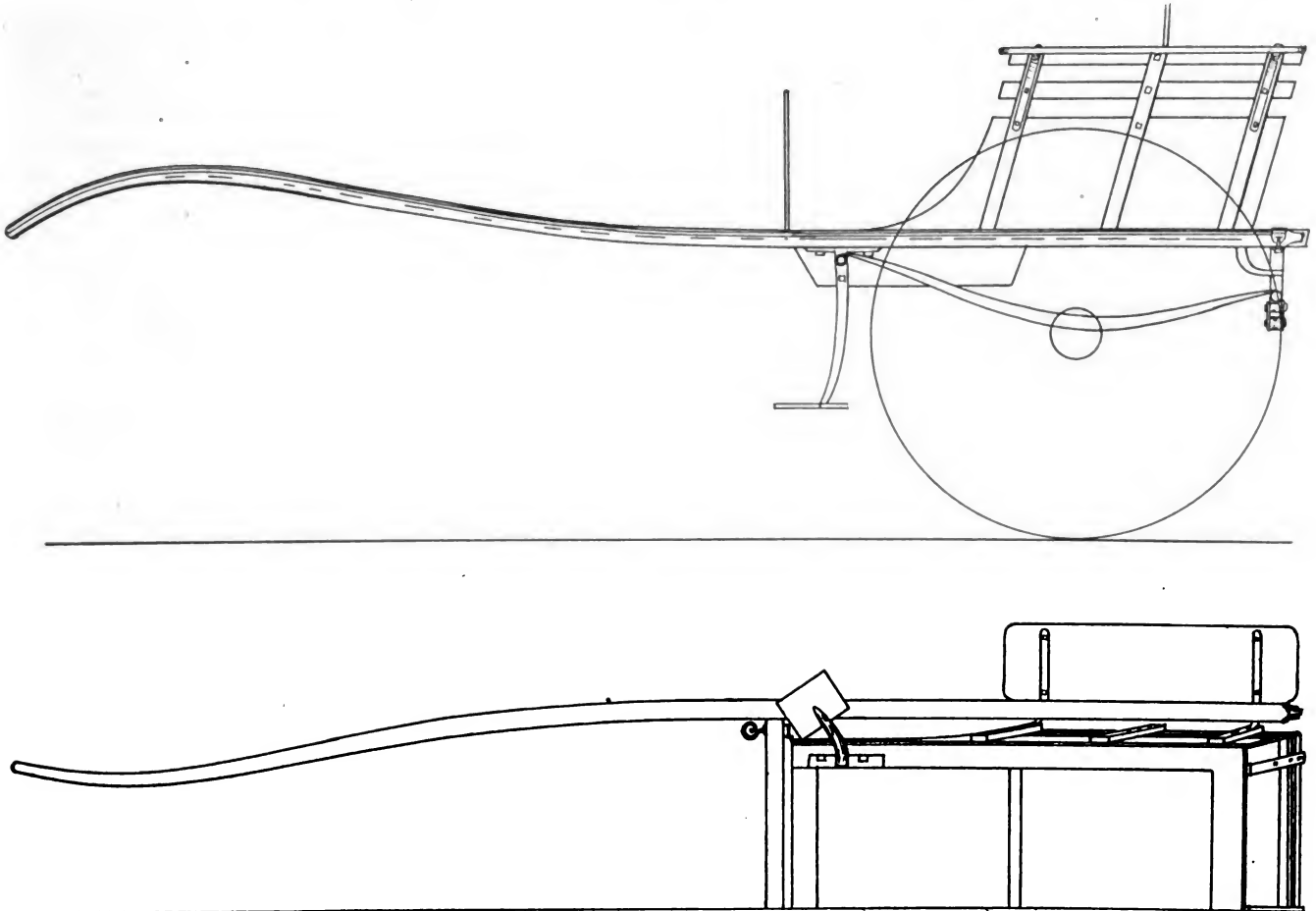


Fig. 1 and 2.—SHOWING THE SIDE AND BOTTOM PLANS OF THE ANTI-HORSE-MOTION SLAT CART.

serve you well and add materially to the trade of your shop.

How To Make Gun Springs.

WM. CHAMBERS.

I have noticed that some gunsmiths are trying to instruct the craftsmen in the making of gun springs. I will endeavor to make the method a little clearer. In the first place, old smiths will admit that the secret is as much in the metal as in the tempering. However, some knowledge of tempering is essential, as is also practice. When both these are acquired you may be sure the main points in the art are won.

I save all old and worn out files, grind off the teeth and make them perfectly smooth. From them I forge all my flat springs, such as main and trigger springs. Take care not to get them too hot or

in metal vessels. The process of bathing is first to heat to a bright cherry red and dip in oil. Let the spring stay in the oil until it shows the color of silver, then cut into the edge a little. If soft after oil bath, dip again and then while it is hot with oil, plunge it into the slag tub. The file will cut the spring just a little if it is tempered right.

Plans for Making an Anti-Horse-Motion Slat Cart.

J. LAWRENCE HILL.

The accompanying illustrations show in detail and complete, a comfortable riding two-wheeler. Fig. 1, the side elevation, and Fig. 3, the back, will give a good idea of the style and also the method of suspension.

The body consists of sills $2\frac{1}{2}$ by $1\frac{1}{4}$ -inch ash, and a back bar which is lapped to

sectional side view showing the cross bars and bottom boards. Fig. 7 is a partial plan of the balance adjusting seat. The two cross pieces are lapped evenly into the seat rails. In the center is a bar with a long slot in it. A bolt passes through the seat bottom and slides in this slot. A wing nut underneath securely holds the seat in the required position.

The suspension is a platform. The hole in the side springs is placed two inches back of the center. This is so that the wheels shall be back far enough and at the same time keep the cross spring as close as possible to the body. The anti-motion arrangement consists of two pivot and two regulating springs. The pivots are a part of the steps. Side and front views are shown in Fig. 4.

Fig. 5 is secured underneath the shafts and fits over the front end of the springs, while the shank, Fig. 4, goes through them both.

On the cross spring in the center, a leaf of spring steel fastens and is bent

the above combination is decidedly attractive and makes a light and also very stylish looking cart.

However, any combination to suit the whim or fancy of the purchaser or maker, can be used on this cart. The

gear surfaces, and a majority of these, it must be said in justice to the manufacturers, are reliable and furnish the painter a means of increasing the output of his shop without increasing to any apparent extent the operating expenses thereof. It is unnecessary to describe with any reference to detail these quick systems or processes. The manufacturers of these specialties will upon application furnish readers of THE AMERICAN BLACKSMITH explicit information concerning their goods. It is therefore rather with the methods of painting which the painter himself may devise and adapt to the requirements of his trade that we are chiefly concerned. Probably a majority of vehicle users located in country districts believe that there is no method quite so sure and reliable as that which has raw linseed oil and white lead as the basis, and while the method may require somewhat longer time to carry it through to a finish they are in most cases quite satisfied to wait.

By strict attention to getting out a nice A 1 finish, the painter in the country shop may not infrequently get an advance over the price which the customer would be willing to pay for the factory painted job. The small shop painter cannot hope to compete in the matter of price with the factory paint shop, but he may, nevertheless, so arrange his work, and in a measure specialize the various processes, so that on the basis of cheaper rent, cheaper living, and a lower rate of general expenses, he may in the long run find his profits quite as good as those of his competitor from the city jobbing or factory shop. If the painter in the small shop can get new work in the shop to the extent of say half a dozen jobs at a time, he can reduce the painting to something like specialism, and to that extent, at least,

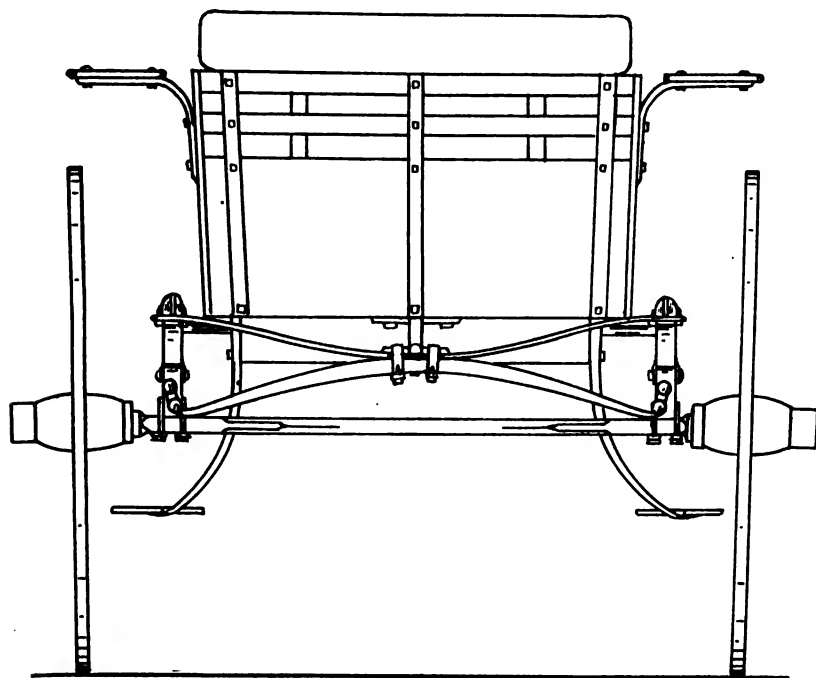


Fig. 3.—SHOWING REAR ELEVATION OF SLAT CART.

and clipped to the spring stay, as shown in Fig. 3. The shafts are then clipped to the ends of this spring. This spring, if made and tempered right and with the shank in the step, which is the pivot, working freely, will give one of the easiest riding carts possible, as the spring absorbs nearly all the motion from the horse. The shafts are entirely independent of the body, and up to the limit of the flexibility of the spring, will move without affecting the body. The dash is fastened to the front bar of the body and not to the shaft bar, as indicated by Fig. 8. The body is 3 feet 5 inches on the sill, 2 feet 4 inches wide on the bottom, and 2 feet 6 inches on top. The total height of side is 1 foot 6 inches. The panel is 12 inches high and 2 feet 2 inches long on the top edge.

The wheels are 3 feet 6 inches high with wood hubs and 1-inch spokes and tires. If the timber has been selected carefully and cleaned up smoothly, nothing looks more nobby and airy than to finish it in the natural color. The iron work, nuts, bolt heads, springs, hubbands, etc., should be painted black and where possible striped with two fine lines of vermillion. The body is also striped with one line of the same color. The trimming should be of corduroy, as it wears well, does not show the dust like darker material and harmonizes with the rest of the vehicle. The effect of

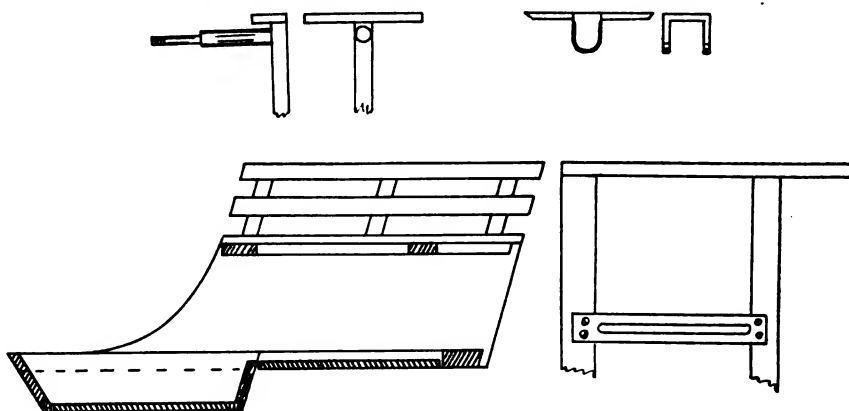
style in vogue in your particular locality should also be taken into consideration, although a distinctive, out of the ordinary finish is preferable to something which has taken the popular fancy.

Painting New Work.

Various Systems Considered—Oil and Lead vs. New Systems. Details of Painting New Work in the Small Shop—Specialization the Key to Success, Etc. Etc.

M. C. HILLICK.

In painting new work, the painter in the small shop must first consider the character of the trade to which he is to cater. Such consideration will to a large extent influence his choice of the



Figs. 4, 5, 6 and 7.—SHOWING DETAILS OF CONSTRUCTION.

various systems of painting new work as practiced at the present time. There are many patent, or so called new systems in use for painting both body and

reduce the cost of painting. It is not so much the cost, however, as it is the process of painting new work that concerns us now. And for a more comprehensive

study of the subject we will divide painting new work into three classes.

Class Number One.

This to include the best grade of work. Sandpaper the job throughout until clean, white wood is the result—until all the grain and fibre of the wood has been cut down smooth. Next dust off and prime. Coating all parts of the vehicle inside and out of body, top and bottom, etc. After 72 hours sandpaper all over and apply a coat of lead. In 48 hours putty all parts requiring such treatment. After 24 hours, apply to the body and seat a coat of roughstuff. Upon this coat look the body over carefully and putty all places missed in first puttying. Apply one coat of roughstuff per day until 4 coats have been put on, using a little yellow ochre, or Venetian red, in

of black japan, and finish with a heavy medium drying body varnish.

In the meantime sandpaper the running parts, and then apply rub lead, rubbing the lead in with the bare hands or with a common harvesting mitten or glove. Apply the lead with a brush and when it begins to get "tacky" rub the mixture into the grain of the wood. Do not coat too much surface before rubbing in, otherwise the pigment will dry up beyond control, and the last state of the surface will be worse than the first. A little practice will be necessary to enable the workman to thoroughly grasp the details of this rub lead work, but for a fine, velvety surface, rich and full of material it is unsurpassed. The running parts having been gone over, set aside for three days. Then lightly sandpaper

thinned to working consistency with raw linseed oil, one part; turpentine, three parts. Apply with a soft bristle brush.

Rub Lead—Mix dry white lead, shaded to a slate color with lamp black, in three parts of raw linseed oil and one part coach japan. Mix to a consistency suited to application with a stiff bristle brush.

"Dead Lead"—White lead ground in oil, colored with lamp black, and thinned with turpentine. The oil in the lead will suffice for binder. Apply with a camel's hair brush.

Roughstuff—Of any good American filler three parts to one part white keg lead, by weight. Reduce to a stiff paste with equal parts of rubbing varnish and coach japan, and then thin to proper working consistency with turpentine.

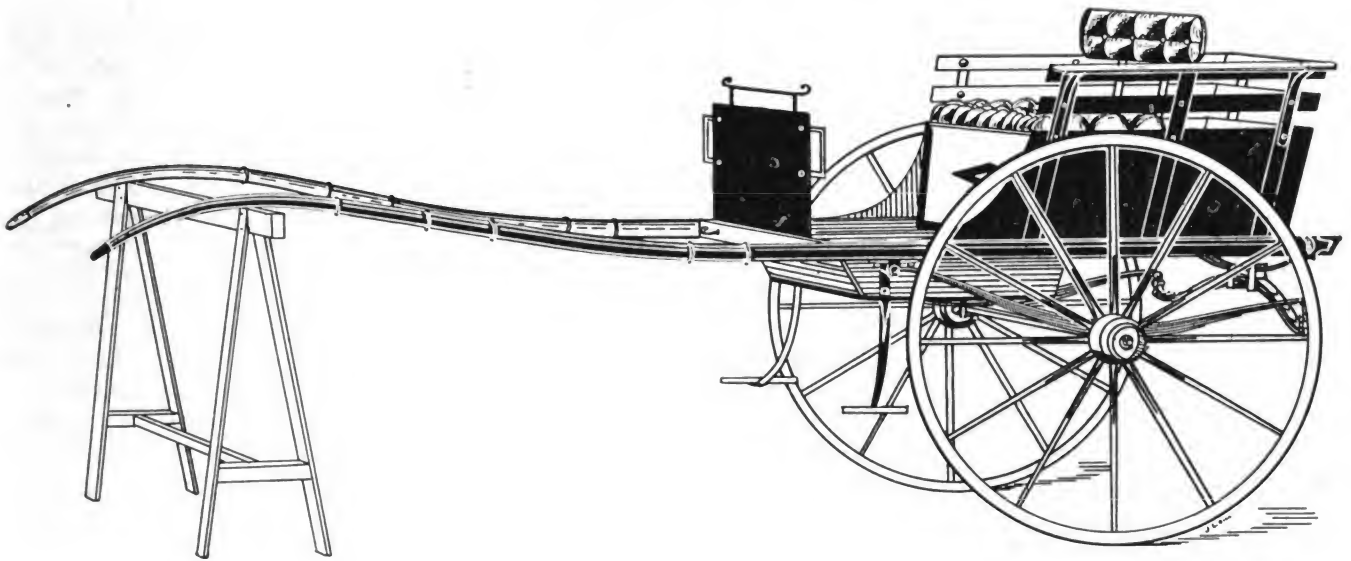


Fig. 8.—SHOWING THE FINISHED ANTI-HORSE-MOTION SLAT CART.

the last coat to serve as a guide in rubbing the roughstuff. Set aside for at least three days before rubbing. Rub out with a piece of artificial pumice stone, or rubbing brick, as it is commonly known, using plenty of water and avoid scratching or bruising the surface. Stand surface aside over night to dry out moisture. Then sandpaper the rubbed surface lightly with 00 sandpaper. Inside of body sandpaper with $\frac{1}{2}$ sandpaper and apply a third coat of lead, putty-glazing all, especially rough places. Apply two coats of color, if black, to the outside, then one coat of black japan, then one coat of rubbing varnish containing enough black japan to maintain the japan blackness of surface, rubbing each coat with 00 pulverized pumice stone and water, and washing up perfectly clean. Finish with a high grade elastic body varnish. Inside of body, upon third coat of lead, sandpaper and apply coat of color, one coat

with 0 paper and apply a coat of "dead" lead *i. e.*, a lead mixed to dry without any gloss. Polish this coat with a little tuft of hair from the trim shop, dust off, and coat up with the desired color. Next apply color-and-varnish, then one coat of clear rubbing varnish. Rub on this with 00 pumice stone (pulverized) and water, the striping having been done upon the color-and-varnish or glazed coat. Then flow on a heavy coat of elastic gear finishing varnish. Black off or touch necessary parts, paint bottom of up body etc., and the job is complete.

Formulas for Mixing Materials Used.

Priming—White lead in oil, three parts; yellow ochre, ground fine, one part. If dark primer shade up with lampblack. Liquids: Raw linseed oil, three parts; turpentine, one part. Coach japan to each $\frac{1}{4}$ gallon of primer, one gill.

Second Lead—White lead in oil colored to slate shade with lampblack,

Putty Number One—Dry white lead mixed to the proper working consistency with equal parts of coach japan and rubbing varnish.

Putty Number Two—Dry white lead, two parts; finely bolted whiting, one part. Liquids: Equal parts rubbing varnish and japan.

Both formulas for putty are good and can be relied upon.

Class Number Two.

Apply priming as in class number one. After drying, putty job throughout. Apply roughstuff directly upon priming. Apply four coats of stuff. After rubbing color body with two coats color. Apply one coat of black japan and one coat clear rubbing varnish; rub out and finish.

Apply rub lead directly upon priming for running parts, sand lightly, and lay on color, then apply color-and-varnish, stripe and varnish with a coat of clear rubbing varnish. Next rub with pulverized pumice stone and water and

finish with an elastic gear finishing varnish as in class number one.

Class Number Three.

This is the so-called cheap job, suited to a certain class of people found in both town and country, and if the processes are carefully carried out the finish will not prove disappointing when price

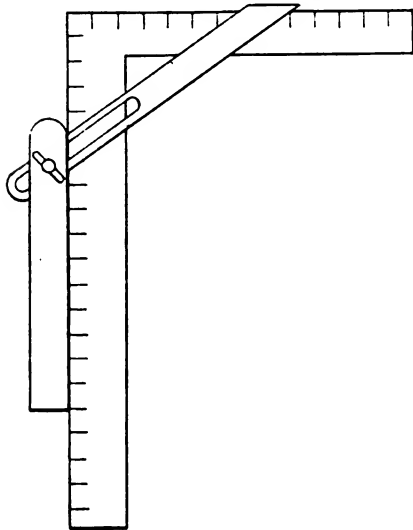


Fig. 1.—SHOWING POSITION OF BEVEL ON THE STEEL SQUARE.

and brevity of details are taken into consideration.

First sand and prime as in class number one. Putty, using formula number two. All open, "eaty" portions of the surface, both body and running parts, glaze with the number one formula putty, cut to a glazing consistency with turpentine. Or rather, on the running parts glaze the face surface of axle beds, side bars, head block, etc. Apply four coats of roughstuff made of equal parts, by weight, of filler and keg lead, stirred to a heavy consistency in equal parts of coach japan and rubbing varnish, and then thinned out properly with turpentine. Apply two coats per day. Rub out carefully, sandpaper and apply two coats of color, one coat of black japan, rub on this coat to knock off nibs, etc., and level down inequalities of the surface, wash up and finish with a medium drying heavy body finishing varnish.

In due time after glazing running parts, sandpaper carefully with $\frac{1}{2}$ sandpaper, and apply a coat of "dead lead," mentioned above; sandpaper on this in due time, then dust off and apply color-and-varnish. Rub this down lightly with a sponge moistened and dipped in 00 pumice stone, wash up, stripe with double lines, and then finish with a heavy gear finishing varnish. These are the three principal classes covering the painting of new work at present.

Note: Mr. Hillick's next paper will be "The Painting of Old Work," in which

he will detail its classes, importance, profits and everything connected with this class of vehicle painting.

How to Make the Joints of Carriage Seats.

F. W. PRICE.

I submit the following rule for finding the necessary bevel for making joints at the corners of splayed carriage seats. First get out the sills, and frame them together. An explanation of this I deem unnecessary as any ordinary wagon or carriage maker understands how this is done. But if he does not he can readily grasp the idea by looking at any ordinary buggy seat. To get the splay or flare for the back and end panels, take an ordinary steel square and a bevel square and set the handle of the bevel square on the blade of the steel square and adjust the tongue to run from five on the blade to seven on the tongue of the square, as shown in Fig. 1. While the splay of seats varies with the different manufacturers, this will be about an average and will give a good, comfortable seat. However, if replacing an old seat, it is well to get the splay from the original, as the irons will then be sure to fit. Having your bevel set for the proper splay, the next thing to do is to find the required bevels for the corner joints. To do this proceed as follows: Take a piece of $\frac{3}{4}$ -inch lumber and get it about the width you want for the back panel and join the edges perfectly straight and square. Now place your bevel on the end of the board and with a scratch awl draw the line AB, Fig. 2. Now set a marking gauge to this at B and draw line BC along the

square down to where BC intersects DE and draw line F, then square across the top edge of the board to G. After you have this done measure the distance from AB and set this off on the top corner of the board from E to H, then the line from H to G will be the required bevel to give a perfect-fitting corner joint, regardless of the amount of splay on the flare of the seat. The above is applicable only to mitred corners, but if you wish a butt joint such as is commonly used on spring seats proceed as above except that instead of setting off EH and making line HG, simply draw a line from G back to E. This line will be the cut for a butt joint; the inside being the longer.

Remember this is to be all laid off while the board is square, but after having cut the joints draw down the ends and leave as much arch in the back as you wish. Also trim off the extra wood from BC to IJ. This will leave the top of the panels level when given the splay. Do not bevel the bottom of the panels, but leave them square and cut the two ends and back off the bottom frame at the same bevel you have been using. This will leave less wood for the screws to go through and will not leave so much of the sills exposed as would be the case if they were square and the panels beveled.

Some Texas Prices and a Shop Layout.

D. W. MURPHEE.

I will endeavor to tell you what we have in our shop in the way of tools and arrangements. We find that power pays, for with it three men can do

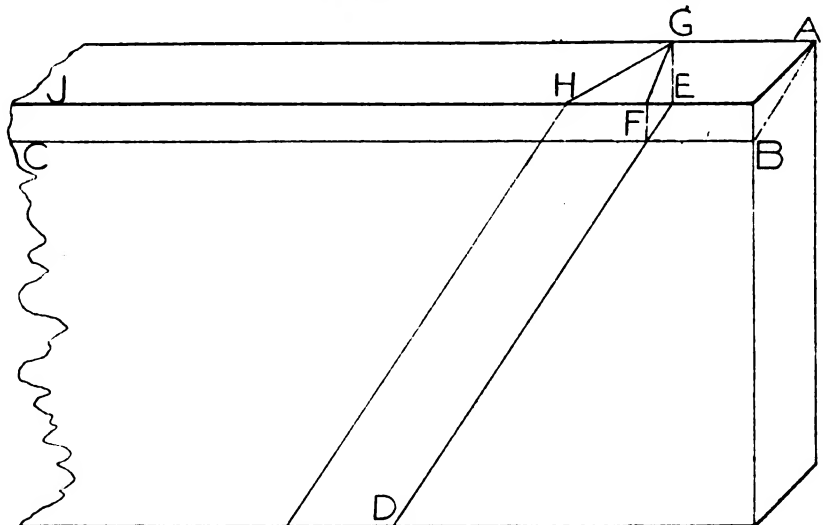
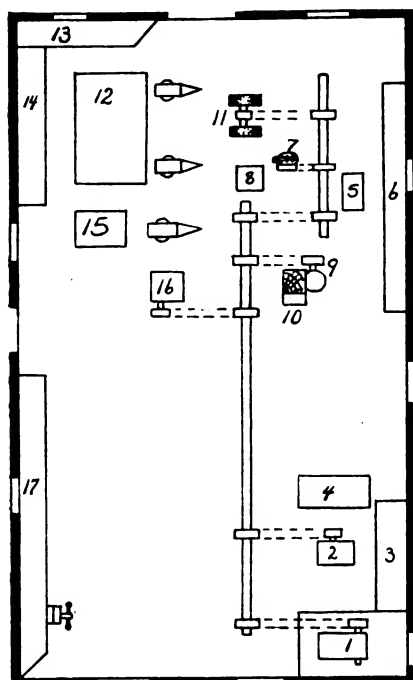


Fig. 2.—SHOWING HOW THE BOARD IS LAID OUT.

inside top edge of the panel. This being done, place the handle of the bevel on the bottom of the board and draw the line DE. Now with a try square placed on the top edge of the board

five men's work. We have a $2\frac{1}{2}$ -horse power Challenge gasoline engine. With it we run a four-fire Canedy-Otto power-blower, a Silver's drill machine and two emery stones, one of which is

for general plow work and the other one for finer work. We have bought a Silver's 20-inch band saw and also run a large grindstone. We also have



THE PLAN OF A TEXAS SHOP.

a House cold tire setting machine and several other improved tools and machines. We expect to continually add to our shop until we are compelled to quit on account of lack of room. Below I give our Texas prices. They may interest some of our northern craftsmen.

Horseshoeing, all around, plain.....	\$1.00
Resetting.....	.70
Horse shoes, calks, all around.....	1.50
One new shoe.....	.25
Reset one shoe.....	.20
Sharpening plow shares, 6 to 18-inch.....	\$0.10 to .25
Cultivator sweeps, 6 to 16-inch.....	.10 to .18
Pointing plow shares.....	.65 to 1.00
Filling wagon wheels, per spoke.....	.20
Wagon tongues.....	3.00
" reaches.....	1.50
" bolster, rocking.....	2.50
" bolster, hind.....	2.25
" hounds, hind.....	1.75
Fellows, each.....	.25 to .30
Cultivator hounds, front.....	1.00
" axles, front.....	3.50
" axles, hind.....	3.25
" bed and frame complete.....	17.50
Set of wagon and buggy tires, each.....	.50
Where they are set cold.....	2.00
Where they are set hot.....	2.50

The accompanying diagram shows the plan of our shop, which is 24 feet by 40 feet.

- 1—A 2½ horse power Challenge gas engine.
- 2—Large grind stone.
- 3—Combined desk and paint cabinet.
- 4—House cold tire setter.
- 5—Punch and shear.
- 6—Steel rack.
- 7—Canedy-Otto blower.
- 8—Leveling block and anvil tool rack.
- 9—Drill press—Silver's No. 14.

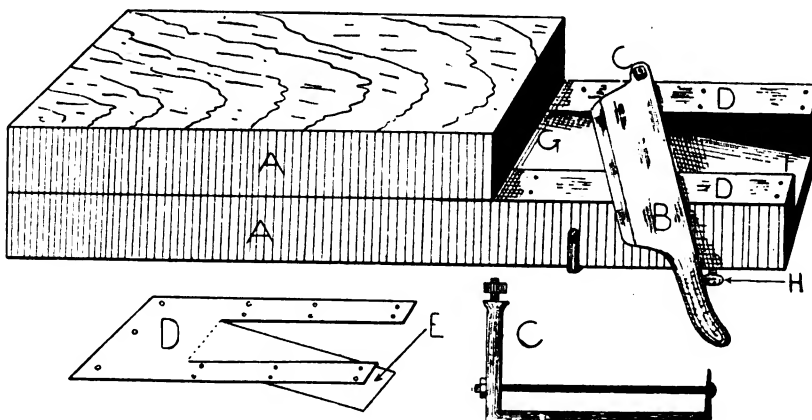
- 10—Tire shrinker.
- 11—Double emery stand.
- 12—Large double forge.
- 13—Iron work bench.
- 14—Iron rack.
- 15—Small single forge.
- 16—Band saw.
- 17—Wood work bench.

An Adjustable Wedge Cutter.

W. E. GRUBER.

I noticed in the March number of THE AMERICAN BLACKSMITH, a diagram of an instrument for making wood wedges. This is the first I have ever seen in any journal. For that reason I send you a diagram of one we made so that the craft may get the benefit of it. It is simple and easy to make and the handiest of any one that I have ever seen, for the reason that the operator can regulate both the length and thickness of the wedges to be made.

The two pieces AA are of hard wood 2 by 4 inches. One piece is 8 and the other 12 inches long. They are bolted together, so that one extends 4 inches longer than the other. A groove about 1½ or 2 inches wide, 4 inches long and about 1 inch deep at F, and even with the surface at G, is cut in the longer piece. Now take a piece of thin sheet steel, or what is better, spring steel as thin as pasteboard, about 6 inches long and cut it like D so that E will act as a tongue or spring. Bend E down so that it will fit in the groove. Now screw this plate on the end of the wood and place a set screw about the middle of the bottom as shown at H. This is to regulate the thickness of the wedges by pushing the tongue either up or letting it down. Let the plate extend about two inches between the two pieces of wood and let



AN ADJUSTABLE WEDGE CUTTER.

both the knife and wedge against the end of the top piece of wood. The knife B can be made of any ordinary piece of tool steel. A strap C with a nut and collar, is to bolt to the bottom and fasten the knife to. We find this the handiest tool of the kind we ever saw and hope some of the other smiths and wagon makers

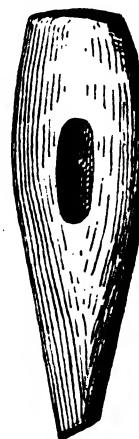
will find it just as useful when they try it.

I find many useful tools explained in "Our Journal" and I think the plan of exchanging hints and kinks a very good one. It not only tells us of new tools but gives the younger craftsmen the benefit of the older and experienced smith's knowledge. It helps us into a better understanding of our brother smiths and tends to break down the barriers of enmity which have existed.

How to Make a Good Cutting Tool.

J. A. LOWRY.

I will tell you how I cut plow steel and almost everything else cold, or at least nearly so, and the kind of tool to use and how to make it.



A GOOD CUTTING TOOL.

To make the tool, take 1½ by 1½-inch cast steel and punch an eye ½ by 1½ inches, one and one-half inches from the end. Finish up this end for the sledge to strike on. Then cut off about 1½ inches from the eye and draw down as though you were making a cold cleaver with a sharp edge, until you have it drawn down to about ½-inch thick on the edge. Now take a file (if you have no emery wheel) and dress the edge perfectly smooth with a little bevel, about 1/8 of an inch is right. In tempering this tool bring to a good straw color. Better to get it too hard than too soft, for if it batters down it will not cut at all. In using

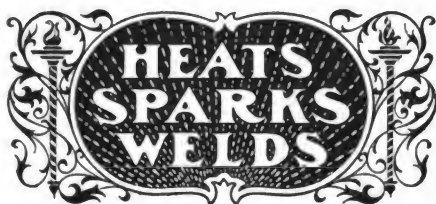
this tool, place it directly over the sharp edge of the anvil, with the heel or cutting corner nearest you and slightly raised. It is on the principle of a shears. The engraving will make the shape of tool plain. With this tool I cut ½-inch plow steel, rod iron, square iron, flat iron and almost everything that I use.

Description of a Horse.

FROM VENUS AND ADONIS.

Look, when a painter would surpass the life,
In lining out a well-proportioned steed,
His art with nature's workmanship at strife
As if the dead, the living would exceed;
So did this horse excel a common one,
In shape, in courage, color, face and bone.

Round-hoofed, short-jointed, fetlocks shag
and long,
Broad breast, full eye, small head, and
nostril wide,
High crest, short ears, straight legs, and
passing strong,
Thin mane, thick tail, broad buttock, tender
hide:
Look, what a horse should have, he did not
lack,
Save a proud rider on so proud a back.



Spring is abroad in the land.

Try to get us a new subscriber this month.

Tact is the knack of doing or saying the right thing at the right time.

The poet says that he who takes pleasure in his daily work is progressing.

What record do you keep of the jobs you do and how the charges are made up?

Roll up your sleeves. The arrival of spring seems to put new life into everything.

Investigate the cause of the break and make the repair properly to prevent a recurrence.

There is no shop at Carlyle, Kansas. A good smith is needed. Address Mr. Perry E. Newton if interested.

The get-ahead apprentice doesn't ask too many questions. He thinks some things out for himself.

Do you carefully read the advertisements in each issue? Much information can be gleaned from them.

A bit of spring cleaning will do the shop no harm. A little water, a broom and a pot of paint—that's all.

A good garden adds much to the comfort of every home. Encourage the young people to become interested in it.

Weak spots. All of us have them, and people generally find out about them in proportion to the talking we do.

Join, if there is a Blacksmiths' Association in your vicinity. If there is not—why not start one? We will help.

Booming times seem to be ahead. What have you done about putting in a side-line to profit by brisk trade conditions?

Religious rites were recently performed in memory of the Japanese horses killed in the battles of the Russia-Japan war.

Knock not thy neighbor—hammer on your own anvil and blow your own fire. How's that for a good blacksmith maxim?

"A place for everything, and everything in its place." Tack this good old adage up in your shop where that careless helper can see it.

Snow is coming again in seven or eight

months' time. Don't wait till then to start a movement for better prices in your locality.

It's all very well to say, let the morrow take care of itself, but the man who is not beforehand today is usually behindhand tomorrow.

Don't go too much by rule of thumb. Understand the whys and wherefores and do some original thinking for yourself occasionally.

Many a blacksmith has retired from business with a snug sum of money laid away. Don't get it into your head that you can't do the same.

Take no thought of craft gossip. Let your work speak for itself. And let it shout your praise loudly, too, while you are about it.

Two good wheelwrights will find an opening at Council Grove, Kansas. If you are interested write to R. M. Armstrong of that place.

Be brief. Money makes the mare go. Time is money. Talking makes the time go. Hence, when you open your business mouth, have something to say, say it, then stop.

A place can always be found in these columns to print good shop pictures, inside or outside. When next you get a good photograph of your shop, don't forget to send in a copy.

Immeasurably the richest of all nations is the United States, with twice as much property as Great Britain, next in line. And we are still continuing to do pretty nicely, thank you.

"I cannot get along without them. Please send me another supply as I am about out," writes an enterprising Ohio smith. If your supply is low, write us for another herd of Pink Buffaloes.

There's a time for all things, and this is the time to organize. The roads will soon be in prime condition and it will then be easy to call a meeting of the smiths in your locality. Shall we send you our plans?

Competition cuts down often the price you are able to get upon your work. Take advantage of competition in the other end of your business by getting the very best prices and terms on everything and anything you buy.

Eighty-three million inhabitants makes the United States the second largest civilized country in the world, Russia holding first place. And many people are coming to think of the latter land as being only half civilized, after all.

Don't be satisfied as long as there is a single shop in your neighborhood which has more custom than yours. Attract patronage by judicious advertising, good work, a well-equipped shop and business-like methods. Don't rest till you are the leader, and don't stop there either.

An interesting prediction has been circulating recently to the effect that the horse would be declared a nuisance on the streets of San Francisco in less than a decade. But it is also to be remarked that the prediction originated with a man who has just purchased an automobile. Others may think differently.

Gold from the sea. Again we hear wonderful reports of an English process by which \$500 worth of gold is extracted

from sea water at a cost of \$50. But the most wonderful part of it is that the public will go on believing in such fakes and parting with its money in chasing these get-rich-quick will-o'-the-wisps.

Electric propulsion for railroads does not seem to be a matter of a great many years. The New York Central is testing a new electric locomotive, with which a speed of sixty-five and seventy miles an hour can be developed. The Delaware, Lackawanna and Western Railroad is also reported to be taking steps toward the electric equipment of some of their suburban divisions.

Think yourself back a hundred years, to the days of few tools, poor tools and everything done by hand and brawn. Would you relish such times? And yet are there not some mechanics today who are little better off than their grandfathers, all for the lack of a few tools, tools which would probably pay for themselves in short order if they were but given a chance?

Earmarks of a progressive smith. What do you consider they are? To our way of thinking, that craftsman is wide awake and up-to-date, who keeps his shop in good shape, who gets acquainted with all improved tools when they come out and buys such of them as will help him, and who regularly reads a good craft paper, never letting its subscription run out.

When a man you suspect is profuse in his promises to pay you in say two or three months, strike him for a note due at that time. Tell him you need the money, and want his note to use at the bank. Such a note will probably put your claim against him in better shape for collection in case he fails to pay it when due. If you can get the note with interest and a good indorser, so much the better.

Henry Maudsley, born in 1770, was the pioneer and originator of modern machine tools. He built, among other things, the first screw-cutting lathe, and left the impress of his mechanical genius upon many eminent engineers and designers. His start in life was in a blacksmith shop, at the age of fifteen, where he rapidly mastered the craft, excelling all others in forging light iron work and in the use of the file.

No doubt many visions have floated through Tom Tardy's head that some day he was to be a rich man, and like some that we know in other walks of life, he spends more time in waiting and watching for prosperity than he does in hustling and hurrying it. No get-rich-quick scheme comes along that Tom is not ready to bite at. He is even now mourning the loss of a hundred dollars of hard earned cash. It was earning three per cent. in the savings bank, but Tom parted with it on the strength of an ad he saw in a second-rate story paper which he takes. The advertisement showed a man sitting back in a big easy chair, arms folded, pipe in mouth, and under the title of "Let your money work for you," promised an impossible rate of interest on all money sent. All Tom has now for his money is a showily printed piece of paper, setting forth that he is the owner of ten shares of stock in the So-and-So Investment Company, and the letters he writes to know where his money is, come back to him unopened and marked "Fraudulent" across the address.

American Association of Blacksmiths and Horseshoers.

Though the smith realizes the manifold advantages of organization, still in many localities, he hesitates to start a movement of this kind, fearing that some of his neighbors may not be willing to co-operate with him. It is true, the greatest benefits result when not a single smith in the country is omitted, but the fact that there are a few men in your neighborhood who do not believe in improving their conditions should in no way interfere with the proposed movement. Any effort to raise the smith's prices to a more satisfactory basis, no matter whether the organization be large or small, is bound to benefit the craftsman directly or indirectly. A certain smith in one of our Western States said that he would not undertake to form an association unless two-thirds of the smiths in his vicinity promised to support him. Of course we cannot blame this man for trying to learn whether or not his fellow craftsmen were in sympathy with the proposed movement, but the point we wish to bring out is this: If you are considering the matter of joining the smiths of your county into a blacksmiths' association, do not hesitate because you fear there are some shops in your district that will not join. Don't wait for your slow neighbor. He will come around just as soon as he can be made to understand the unlimited advantages of membership in such an organization. The moment he sees your plans in successful operation, he will look up to the association with admiration, and the chances are that he will apply for admission.

As a rule, the man who is not willing to co-operate with his fellow workmen in a movement of this kind is the one whose work is of an inferior quality and who fears that it is not worth much more than he is getting for it at the present time. The smith who cuts prices is usually a poor workman, whose supply of tools is sadly deficient, his equipment consisting of little more than an old hammer and an old anvil with the edges broken off, and very often these men do not control enough trade to make them worth while considering.

The American Association of Blacksmiths and Horseshoers is endeavoring to form a branch organization in every county in the land and together with its official organ, **THE AMERICAN BLACKSMITH**, is working conscientiously toward that end. If the craft were solidly organized, think of the many reforms we would be able to accomplish. Blacksmith, horseshoer and wagonmaker

should not hesitate to take an active interest. Any smith can start the ball rolling in his locality and every man connected with the craft should feel it his duty to take up this matter immediately. Send to us for an outline of the work, for we wish to lend every aid. And you could select no better time to interest your fellow workmen, for with the roads in excellent shape your first meeting could be called at an early date.

The Blacksmith Association of North Iverness.

The smiths of Nova Scotia have followed the teaching of the Association and have formed "The Blacksmith Association of North Iverness," an exceptionally strong and prosperous organization, considering the short time it has been in existence. Emulating the example of the American Association of Blacksmiths and Horseshoers, the smiths of Nova Scotia are trying to band together the members of the craft in their county, forming branch associations throughout the province. The headquarters will probably be at Eastern Harbor, the home of the Iverness Association.

Below is an extract of the prices recently adopted:

Four new shoes	\$ 1.00
Four shoes, reset, .....	.50
Cart wheels complete	20.00
Setting tires .....	.50
New tires	\$5.50 to 6.00
New axle stubs	6.00 to 7.00
Mounting cart box	5.00
Cart travellers, each	1.00
Hoes, each .....	.50
Plow shares	3.00
Laying coulter .....	.60
Bob sleds (iron) complete	10.00
Crow bars .....	.75 to 1.00

The Side You Should Be On.

A BLACKSMITH.

When I came to this place two years ago, I rented a shop with tools. I paid big rent, but the tools were poor. However, I managed to pay my rent and save enough to start a new shop with new tools. This I found much nicer than to get along with tools that are worn out. Take for instance the old bellows which I used myself and then get an up-to-date blower and see the difference. I think you would then agree with Mr. Pope regarding blowers. He says: "Get a cord of wood and saw half of it with a buck saw and the other half with a power driven saw and you will have a good illustration of which is the best." I agree with Mr. Pope from beginning to end regarding bellows and blowers and any other new improvement in tools. I am always on the lookout for something

new. I have now got new tools throughout the shop which are the latest in design and I expect to add many more as I go along. Now I say to brother smiths, get out of the rut and get good tools of the latest pattern and see how much better the work will be that goes out of your shop. I think you will then agree with me, as it will bring you more money and more customers.

I am at present running a shop in a small country town. I do all kinds of work and have a shop 32 by 20 feet. I have just installed the following new tools: A Royal Western Chief blower, a Cray Brothers anvil, a 60-pound Columbian farrier's vise, an Ideal tire shrinker, an improved Ideal roller-bearing tire bender, one set of Little Giant screw plates, hammers, punches, swages, fullers of all sizes and wood working tools of all kinds. I shoe horses and repair carriages and wagons, make lots of new hay ladders and do all kinds of work. I have averaged \$60 per month since I came here. Below are some of the prices I am getting for my work:

Horseshoeing new, per set	\$ 1.00
Resetting shoes, per set .....	.60
New tires, per set	4.00
Wagon tires narrow, per set	6.00
Wagon tires, wide, per set	10.00
Hind bolsters, with stakes	2.00
Front bolsters, with stakes	1.75
New axles	2.50
Tongues	1.50
Buggy rims, $\frac{3}{4}$ or $\frac{7}{8}$ -inch, per set ..	4.00
Rimming 3-inch wagon wheels ..	7.00
Cutting down buggy wheels	6.00
Setting buggy tires, per set	1.75
Setting wagon tires, per set	2.00
Sharpening plows .....	.20
Wagon boxes	10.00
Hay ladders	15.00

The Use and Construction of Goosenecks.

C. RICHARDSON.

It is almost impossible to think of a vessel that does not carry a boom or spar for handling freight or carrying sail. If used for either of these purposes, it is necessary to have a universal joint for the spar to swing on, that is, so the stick can be raised, lowered or swung sideways without straining it.

There are three popular styles in which this joint is made for derrick use: One is the plan here shown. The second method is as follows: Make the two halves as at Fig. 1, A. One going into the truck or step as A does and the other into the spar. This is a much cheaper way to make it than plan number one, but is not as strong, it being necessary to band the stick in two or three places to

prevent its splitting. Style three is one used throughout Great Britain and is similar to plan one, except at the joint B, where instead of having a bolt, two worked out eyes are joined as links in a chain. This makes a good working joint, but wears very rapidly. The jaw tip

equals $45\frac{1}{2}$ square inches. An eight-inch square billet will therefore make this center, there being 64 square inches in the cross section.

The amount of stock used in the sides, is next required. These are shown at E, and are 4 feet long by 7 inches wide at

with a pair of two-inch spring fullers chamfer the corners of the jump as shown at F. Then dress up the end to fit the inside of the jaw. The next step is to weld on the belaying pine jumps, these are made in a ball swage and then drilled before welding on.

A blocked out and also a finished view of the lower part of the gooseneck is shown in Fig. 3. I do not think it is necessary to explain this any further. The plate which the lower half of the gooseneck rests on is just a flat piece with a boss left on it and the end turned over so as to take three bolts.

Welding Springs and Steel Tires.

J. D. THOMAS.

I presume all of us have the best way to do a certain kind of work, still I think we should never get too old to be taught a better way or something new. I think, like Brother Van Dorin, that splitting or riveting a spring in order to weld it is unnecessary, but he also says to weld quickly or the thin edge of the scarf might cool off in coming in contact with the anvil. Now, Brother Van Dorin, try my way and you need not fear the thin edges cooling off. Upset both ends and scarf as in your method, but instead of putting the scarfs together just reverse

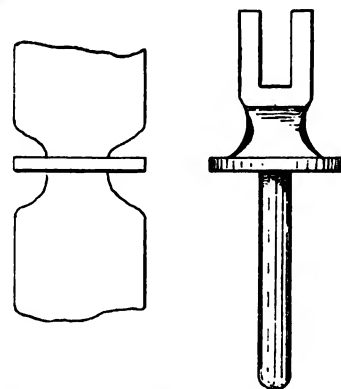


Fig. 3.—METHOD OF SHAPING LOWER PART OF GOOSENECK.

them and put the flat parts together. This places both thin ends on the main body or part to be welded and neither end touches the anvil until you have it thoroughly stuck and welded. In the engraving A shows my way of placing the scarfed ends and B shows Brother Van Dorin's method.

A Handy Attachment for the General Repair Smith's Anvil.

BY ADVANCE.

A very handy anvil vise which the general repair man will find very convenient is shown in the accompanying engraving. Its construction is very simple. The smith can rig up his anvil in this manner very easily by study-

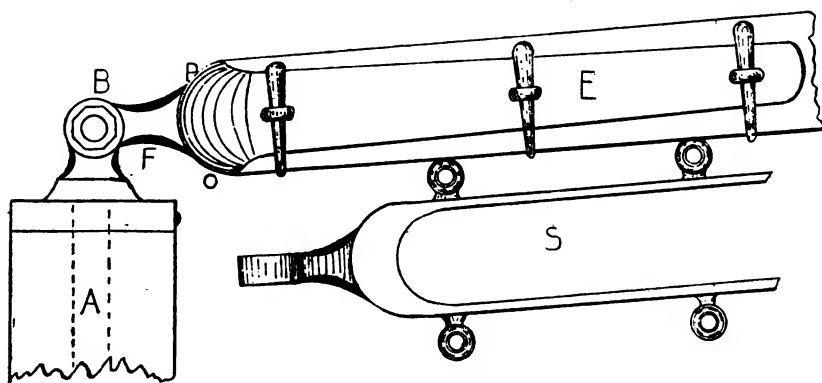


Fig. 1.—SHOWING PLAN AND CONSTRUCTION OF GOOSENECK.

properly fitted, compared with this style, is far superior, there being no friction to speak of in the jaws. The belaying pin jumps on the sides of the gooseneck are to fasten any overhead gear to, which comes down to the deck.

We will consider the sleeve of the gooseneck first. This part goes on the boom. The billet should be large enough to make the jump and the center, and a

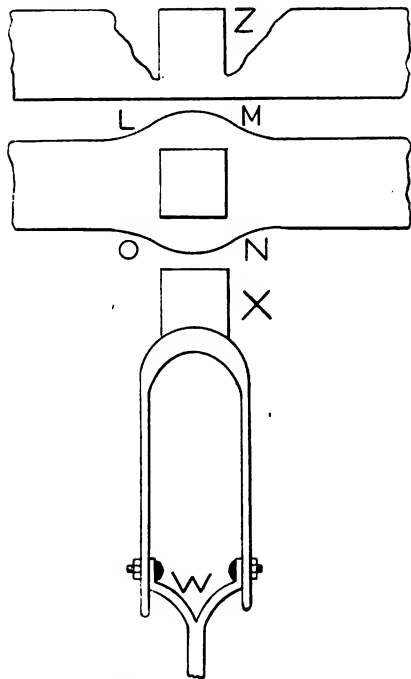


Fig. 2.—SHOWING METHOD OF FORGING ARM OF GOOSENECK.

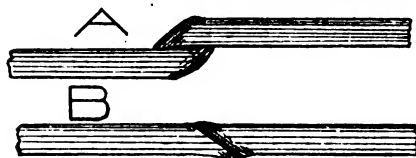
cross section of it should measure $17\frac{1}{2}$ square inches plus the number of square inches in the jump. This latter is four inches square by seven inches long from the top of the plate. The cross section of the jump therefore contains 28 square inches. This, plus $17\frac{1}{2}$ square inches,

the large end, and 5 inches wide at the small end they are one inch thick throughout their length. To get the area of this or any tapered piece of work, add the area of both ends and divide by two. In this case, the sides are 7 inches by 1 inch at one end and 5 inches by 1 inch at the other, or 12 inches. Dividing this by two, we find six square inches to be the area throughout. We now multiply this area by the length, which is 4 feet or 48 inches. This gives us 288 square inches, as the result. Dividing this by the area of the eight-inch billet we find that $4\frac{1}{2}$ square inches are required to make one side, or 9 square inches for both.

Now, having these lengths, fuller your stock as shown at Z, Fig. 2, and draw the end so as to hold with your handy tongs. If the billet is too heavy to handle while drawing out the sides, it should be cut off at this heat. This will save reheating later on. Next, draw the sides to the desired size and shape. Then with a heat in the center break down the sides of Z, which form the socket for the end of the spar, as shown in Fig. 1, at O P. Now sink in stamping block, spreading out the sides to the required width and thickness, taking care to leave large fillets at L, M, N, O, Fig. 2. Now bend as shown at X, and fasten with a clamp made as shown at W. This acts as a porter bar as well as a clamp and makes handling very easy if it is left long enough.

It is now necessary to flange the sides O P, so they will look as shown in Fig. 2. Although this may seem to be the most difficult part, it is really the easiest, for by keeping it well clamped and heating one side at a time, the sides work into their places with two or three heats without any tool to form them. Now

ing the plan shown. The rod or pin A, should be so arranged as to be easily withdrawn. This allows the attachment to be removed when in the way. The jaw B of the attachment may be as wide as the heel of the anvil. However, this is optional and will perhaps in some



WELDING SPRINGS AND TIRES.

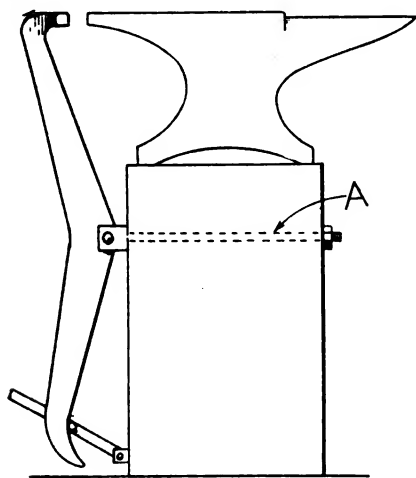
cases be handier if narrower. The horse-shoer will find this device especially useful in holding shoes while turning or sharpening calks.

A Practical Talk on the Tempering of Springs.

DAYTON O. SHAW.

No matter whether a smith is stationed in a dark corner of the basement of some machine shop or under the spreading chestnut trees, he is supposed to undertake any job that comes to him. The tempering of springs being rather a ticklish job, I will endeavor to give some pointers here. The writer has been tempering springs that go with stone lifter machines. The agent of these machines says that in the many shops he has visited in New England and Canada, he has found only a few smiths who succeeded in tempering the springs. For the benefit of the young craftsmen I will endeavor to tell how it is done.

The spring C is made of wire $\frac{3}{8}$ -inch in diameter. From A to B it must not be hardened. Take the wire in your tongs as far as A, and heat until red, then plunge in oil (lard or linseed), up to your tongs at A. When it is cool, run it back



A HANDY ANVIL ATTACHMENT.

and forth over your fire until it begins to blaze, then take it away from the fire and when it has finished blazing, plunge it again into oil. Do it quickly this time

for you are now drawing the temper. You should blaze the oil off three times on wire this size. The spring D is a coil spring, it is smaller wire and the oil should be flashed off only twice; otherwise follow the directions for C.

The spring E is a fish hook. The wire is $\frac{1}{2}$ of an inch in diameter. When this was tempered it was tested by inserting the point of the hook in a leather strap which held a fifteen-pound weight and was supposed neither to break nor set, but return to shape. A number of men tried it without success. To temper this spring, take it in your tongs at E and lay it in your fire, point up. Heat first from E to B, then roll toward the point and harden. Now take a piece of potato and insert the point of the hook in the center of it as far as A, as shown in F. Next, dip into your oil all over and blaze off once, then remove the potato and dip again. This time have the point up and when the oil burns at B, take from the fire. Burn the oil off twice after you remove the potato. The hooks that were tempered in this manner withstood the test of 25 pounds and gave perfect satisfaction.

This principle of covering the thin part after hardening and drawing the thick part until it equals the thin and then drawing all together, may be followed in other things, whenever a thick part and a thin part are to be made of an equally toughness.

Fast Driving On Asphalt Pavements.

BY DRIVER.

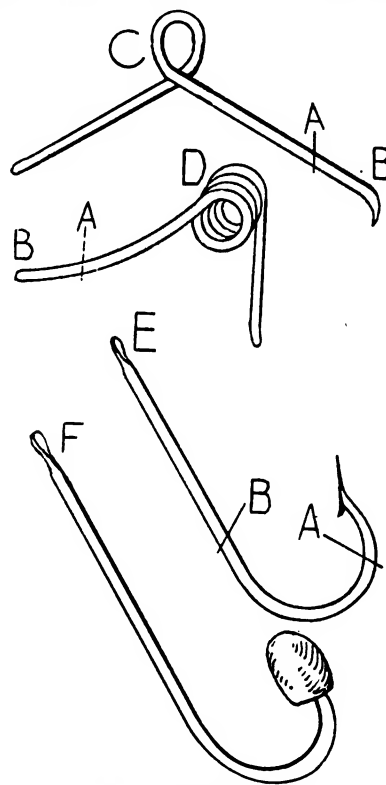
It is a well-known fact that hot fitting if not properly performed will permanently injure a horse's foot, but it is not generally known that fast driving on asphalt pavements will injure an animal's foot in practically the same manner as careless hot fitting. Such is the fact, however, and the manner in which this injury is brought about may be briefly explained as follows: The metal shoes coming in rapid contact with the smooth and, in summer, hot pavement, and the continued slipping and sliding of the feet upon the asphalt cause the metal shoes to become very hot. The shoe being held firmly against the hoof, the heat very naturally is transmitted to it. Should the hoof be pared rather thin or insufficient horn be present for the proper protection of the sensitive tissues, the high degree of heat in the shoe will not only cause intense pain in the sensitive parts of the foot, but will also injure these parts, the injury in some cases developing into a serious disorder. A case has been brought to

our notice of a horse which had been driven for several hours over the hot pavements and had cast its shoe. This was found on examination to be heated to so high a temperature as to forbid its being picked up or handled for some minutes.

How to Re-spoke a Metal Wheel.

JAMES W. HONEYWELL.

Some time ago one of the wheels on a threshing machine run by an eight-horse power engine smashed down. The owner of the machine tried at a number of shops to get the wheel fixed. Each smith told him he would have to get a new wheel. He came to me and after a little figuring we fixed it. We used a $\frac{1}{2}$ -inch iron rod, cut the spokes $\frac{1}{2}$ -inch longer than the required length and upset them in the hub, marking each spoke so as to get them where they belonged. Then threads were cut at the other end of the rods and a jam nut used. The spokes were then driven in hub and the



A TALK ON TEMPERING SPRINGS

wheel trued up with jam nuts, tapping the spokes while truing up. When true, head the spokes and see that all nuts are tight, so the job will last. This engine weighed 50,000 pounds and the wheel is solid yet. This job was done four years ago, so I think I did very well.

A good way to remove spokes from buggy wheels is to place the spoke in the vise with the inside of wheel up. Take a short block of wood, place it against the hub above the spoke and strike with a six-pound sledge. One crack will most

always bring it. Use a piece of felt to keep from marring the paint. This method I have used with success and I pass it along in the hope that my brother craftsmen may find it a help.

How to Make Butcher Knives.

W. P. WOODSIDE.

Making butcher knives is a side-line by which the smith may make a few shillings during his spare time. Es-

pecially those smiths having power in their shops will find this line very profitable. The six-inch knives are the size most commonly used so I will deal with them only. I use steel 1 by $\frac{3}{8}$ of an inch or $1\frac{1}{8}$ by $\frac{1}{8}$ of an inch. There is less work on the latter of course, but I do not think it makes as serviceable a knife as the former. The blades taking $8\frac{1}{2}$ inches, I lay out the bar as shown at A in Fig. 1. This saves steel and also work in forging the blade, as this method of cutting leaves the blade very nearly the right shape with very little work. The bar may be cut cold with the shears. The next operation is to put on the shank or part to receive the handle. This may be forged, ground or sheared, whichever you prefer. I prefer forging (if sheared or ground $8\frac{1}{2}$ inches will be necessary). If the blades are made of $\frac{3}{8}$ -inch material I bend them slightly edgewise and draw the cutting edge down along the concave edge. This bending prevents the knife from having too much curve in the back, which would be the case if we were to draw one edge of the straight piece down thin without continually straightening it. If the blades are made of $\frac{1}{8}$ -inch material it is not necessary to bend them any as the thinning down of the cutting edge is not sufficient to curve the back much, but only enough to give it the right curve.

For skinning knives the blades are bent edgewise, but the drawing is done on the convex edge. As these knives must have considerable curve to them, the $\frac{3}{8}$ -inch material is of course not bent quite so much before drawing the edge as is the $\frac{1}{8}$ -inch material. In forging the blades, spread the point out until it is about $\frac{1}{8}$ to $\frac{3}{8}$ of an inch wider at the point than at the handle. See B, Fig. 1.

little motion as possible. The hardening bath should be linseed oil or brine. I prefer the brine heated to about 80 or 90 degrees. If you have heated the knives evenly and have put them in the bath carefully they will be straight. But should they be slightly warped, they can be easily straightened when you are drawing the temper.

Now polish the blades with emery cloth or touch them up on the emery wheel, so that you will be able to see the temper colors. The top of the plate which you have on your fire is a fine place to draw the temper. Place knife on plate, back down, and move it back and forth so as to draw the temper evenly, as one part of the plate is liable to be hotter than the other. If your blades are warped, as soon as a straw color appears place them on the anvil and strike them on the hollow side with a tool shaped like a mill pick. Use very quick, light blows and you will find the blade will straighten very easily. Now if the temper has not drawn down enough hold it over the hot plate again. I leave my blades purple or so a fine file will take hold of them quite easily. Next grind and rivet on handles, and your knives are ready for sale. I get 50 cents for the

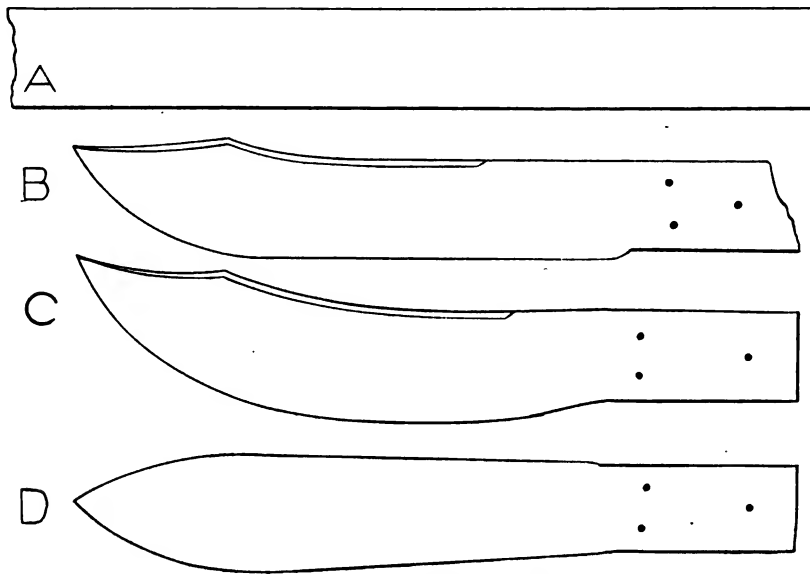


Fig. 1.—BUTCHER KNIVES.

After the forging is done, heat the blade to a low even red and cool it in slacked lime. This last heating helps to relieve the strains that may have been caused in the steel while forging and which might cause the blades to crack or warp. After the blades are cool, give them a rough grind in the flat and then even up the back and cutting edge to the desired shape. Next, place the blades in their handles and drill them (handle and blade together), number each blade and handle so you will not have trouble in getting them together afterwards.

Handles give best satisfaction if made of beech. But birch also makes a good handle, if it is placed in linseed oil for a couple of hours after the blade has been riveted in. The size of handles for six or eight-inch blades should be $1\frac{1}{8}$ by $\frac{1}{4}$ by $4\frac{1}{2}$ inches. See Fig. 2. Use three rivets as shown in the engraving. These should be of brass wire as this rivets easily. Use a number 35 drill and 16 gauge wire.

For hardening and tempering the blades build your fire long, making the sides of it high with wet coal or bricks. Lay a piece of iron plate on top of this to keep the heat in as much as possible. Use coke, if possible, as fuel, broken up very fine. A gentle blast is best. Heat the blades as evenly, to as low a heat as the steel will harden at. Plunge slantingly into the hardening bath with as

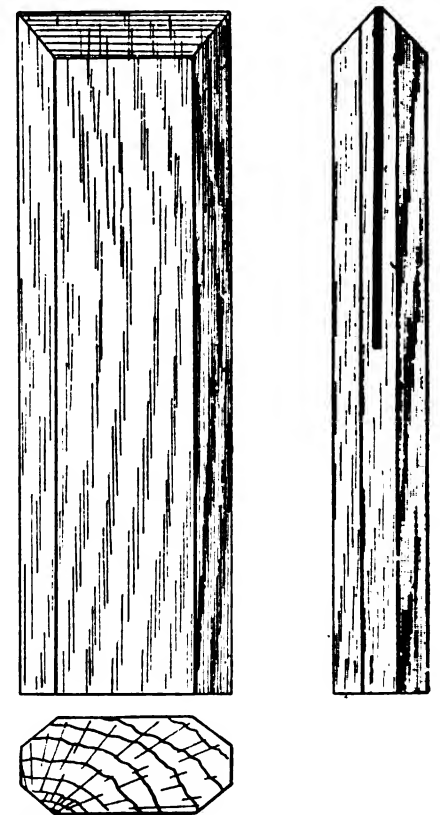


Fig. 2.—SHOWING SHAPE OF KNIFE HANDLES.

sticking knives of six inches and 60 cents for the skinning knives. The sticking knife is ground sharp along one entire edge, but only about three inches on the back edge. See D, Fig. 1. The steel

for knives may be bought from any of the leading steel mills. The Crucible Steel Company of America has a warehouse in almost every State in the Union and also at Toronto and Montreal, in Canada. Their main office is the Frick Building, Pittsburg, Pa. In ordering steel, state that you want it

business methods—these are the requisites of the successful business man.

They are the so-called "short-cuts" to a successful business life.

The Care of the Colt's Feet.

H. W. FERRIN.

At this season of the year, when colts are making their appearance, it is an

The shoeing of interfering horses is perhaps the most difficult problem which confronts the shoer in his every day practice; 75 per cent of the interfering is the result of defective conformation of the limbs and feet, and when you remember that 50 per cent. of the defects might be prevented by the application of proper treatment in colthood, the significance of the truism "No foot, no horse" becomes very apparent. "As the twig is inclined, so grows the tree," is an old saying, which illustrates the case in point, for it may be truly said, that as the hoof is inclined, so grows the limb above it, for the limb tends to grow in the same direction as the feet. The only time to care for the colt's feet is between the age of one and twelve months. When the colt is over a year old, the limbs are set. The bones and joints are strong and there is little hope of a change of position being effected at this late date.

The first week of the colt's life he should be critically examined by some one competent to judge defective conformation of the limbs; the slightest deviation from the normal position should be carefully watched. If the youngster is basewide in front, the greater weight will fall on the inside of the front feet, hence the wear being greater at that part of the foot. The inside heel and quarter will remain low, while the out-



THE FIRST SHOP RUN BY MR. CAMERON.

for butcher knives and the steel maker will send you the steel most suitable for the purpose.

A Progressive Smith of South Dakota.

The accompanying engravings show the first shop run by Mr. Alexander Cameron of Wilmot, South Dakota, and also his present shop. The latter was built four years ago and is 25 feet wide by 65 feet long.

Mr. Cameron is a hearty endorser of power and improved machinery in the smith shop. His shop is equipped in an up-to-date manner and contains two fires, a gasoline engine, a power blower, two hand blowers, a trip hammer, an emery stand, a drilling machine, hot and cold tire setters and a shoeing rack. The upper story of the building is rented for lodge purposes.

Besides doing a large general blacksmith business Mr. Cameron is also an agent for Deering Harvesting Machinery and Case Threshing Machines and he says: "I find these agencies a great help to me. I will handle anything that will net me an honest dollar.

The example of this up-to-date smith is worthy of imitation by craftsmen generally and the progress made by him can be equalled by any smith who will keep alive to his opportunities. The ability to handle a side-line profitably, this means observing the needs of your customers and supplying them at a profit, giving customers full value for their money, keeping collections down, a genial disposition and systematic

opportune time to call the attention of the horse owner and shoer to the vital importance of properly attending to the colt's feet. We hear farmers and stockmen talk about the proper time to wean the colt, how to feed it, to raise it, and most everything else, but strangely enough, the feet are supposed to take care of themselves. It is only on well



THE SHOP OCCUPIED BY MR. CAMERON AT PRESENT.

regulated stock farms that a horseshoer is regularly employed to make a monthly inspection of the youngsters' feet. I have visited many a stock farm and have seen colts' feet growing in every conceivable shape but the right one.

side will grow long. This uneven bearing will tilt the feet to the outside and the pasterns and fetlocks to the inside, as shown in Fig. 1. The basewide position consequently becomes greatly aggravated, the pasterns and fetlocks being

also affected as a result of the neglected hoofs. The bones and joints of the colt at this period of life quickly adapt themselves to the new position, which if not promptly remedied becomes permanent.

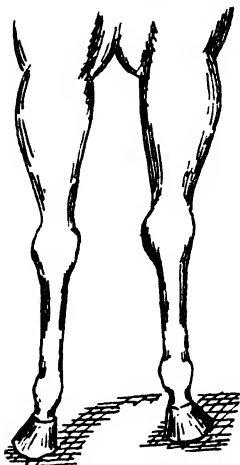


Fig. 2.—BASE-WIDE COLT WITH HOOFS TOO HIGH ON OUTSIDE.

Again I would remind you that the wall of the hoof grows much faster at the toe than at the heels. In a natural state this surplus growth of toe is counterbalanced by the extra wear at that part of the hoof, but where colts are raised in a domesticated state, in limited pastures or paddocks, there is not sufficient wear to keep the hoof in a normal condition. The abnormal growth of toe sets the colt back on his heels, with too much tension on the flexor tendons, as in Fig. 2. If this condition be long neglected, the colt will grow up with an abnormally oblique pastern and low heels.

It is common to see a baby with weak ankles. I have seen some almost walking on the inside of the shoe. In like manner some colts are foaled with weak



Fig 2.—SHOWING HOOF ABNORMALLY LONG.

fetlocks. The pasterns may lean a little in or out, and one or both may be affected, but usually one joint is affected more than its fellow. If the pastern is inclined outwards, the inside of the foot will be low while the outside will grow long. On the other hand, if the pastern

inclines to the inside, the inside toe and quarter will grow long while the outside and quarter will remain low or curl under the foot, thus greatly aggravating the deformity. One of my patrons drives a typical case of this kind. He told me he bought the colt when a yearling. Her ankle was so badly twisted that he never thought of her being able to work. He got her cheap and thought of using her for breeding. But as she developed, the fetlock grew stronger, and notwithstanding the deformity she works every day. The twisted joint, however, makes her travel miserably awkward, and furthermore, she never grows any hoof on the outside, while the inside needs to be pared at each shoeing. She wears so heavy on the outside that one by one-half inch cast steel will only last three weeks, while the inside does not wear any. This is one of those deformities that might have been greatly modified or even entirely cured if treatment had been commenced when the colt was a month old. The proper treatment in this case would have been the application of bandages and splints to strengthen and straighten the weak joint. The inside of the hoof should have been kept low and a shoe applied as shown in Fig. 3. This is a three-quarter shoe that I have used with marked success in such cases. It is made of a piece of band iron about one inch by five sixteenths. Draw it out narrow at the toe, and bring it only far enough round the toe to hold a clip to assist in holding it on the foot. Turn an extension or spur on the outside heel and fit the full width of the iron with the exception of the nail holes outside of the wall. See Fig. 3. If this plan is properly followed, the half shoe will meet the ground first at each step, thus assisting very materially to restore the pastern to its normal position.

I do not mean to convey the idea that if all the colt's feet were properly attended to there would be no defective conformation of the limbs. But I do mean to say that 50 per cent of such cases could be greatly modified by proper care at the proper time. Some of them which result from neglect alone would be entirely cured.

An Old-time Horseshoe.

OSCAR E. PERRIGO, M. E.

One of the keenly observing correspondents of a technical journal once said: "I wish the ancients would let our modern inventions alone," and it does seem to be a fact that old things become new once in a while, and the heralding of their good points by glowing advertisements,

in which they are claimed to be patented, appears to be a little far-fetched.

For several years there has appeared on fences and other points of vantage in this vicinity, large, colored posters, setting forth the immense advantages for

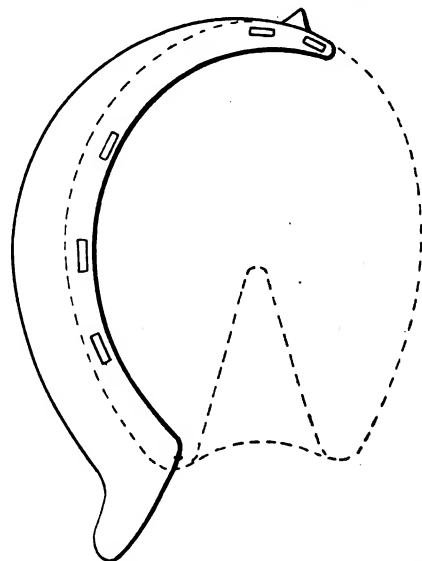
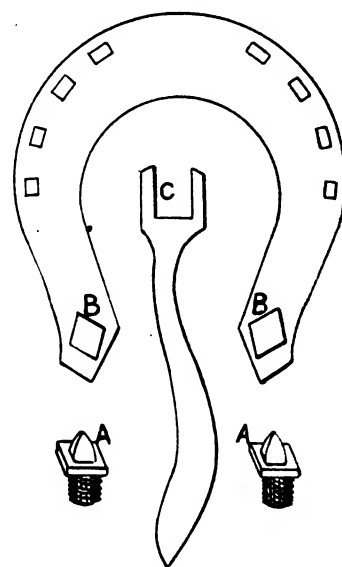


Fig. 3.—A THREE-QUARTER SHOE. DOTTED LINE INDICATES OUTLINE OF HOOF.

the safety of horse and man in the use of a patented, removable heel calk in winter when the ice renders frequent sharpening of the shoe calks a necessity. It is by no means a new invention, however, as will be seen by the accompanying engraving and description. The engraving, as will readily be seen, is that of a horse shoe with interchangeable heel calks. It is an exact copy of one published in the *Mechanics' Magazine* in 1833, in which the inventor says: "The two steel nuts marked B are made



AN OLD-TIME HORSESHOE.

barely a quarter of an inch high, and are worn in the winter when the roads are not slippery. When frost comes, and you wish the horse turned up, or more

properly speaking, rough shod, you take out the two nuts, B, by means of the spanner, marked C, and put in the two nuts marked A. The whole is done in a few minutes."

Why a patent was ever granted upon this device in recent years is one of the things which the authorities at the Patent Office in Washington probably know a good deal more about than we do. Nevertheless, it is only one more of the hundred of such instances that are constantly coming to light in these days of persistent investigation into inventions both new and old.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

A practical steel worker says: When a defect occurs in the same place in a number of finished articles you may feel sure that the steel is not at fault. The method of working and making is the trouble.

While watching the woodworker one day last week we noticed that he used chalk on his sandpaper. Rather a peculiar thing we thought, but he said it made the sandpaper cut better and last longer.

They have been using a new steel hardening and tempering mixture at the shop with very good results. It is made as follows: Into 10 gallons of soft water put six ounces of saltpeter, a pint of salt, a teaspoonful corrosive sublimate and one ounce of powdered alum.

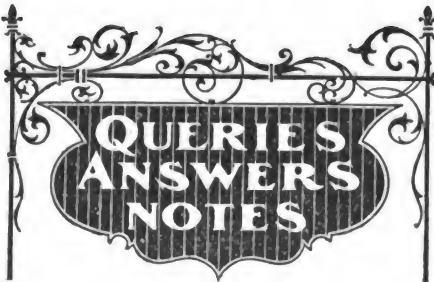
A horse which had the habit of breaking his halter came to the shop the other day and as it would be some time before he could be shod, the boss hitched him in this manner: After doubling a stout half inch rope he passed the doubled end under the animal's tail in the form of a crupper. He then crossed the two ends over the back and brought them, one on each side of the head, through the halter rings and then to the tie ring. After one or two attempts to pull back, the horse stood very quietly.

The boss makes it a point to have a bottle of lime water and linseed oil always on hand. He has found, in his years of experience, that this is a most excellent "first aid" for burns of all kinds. The formula, he tells us, consists of equal parts of lime water and linseed oil, but as these ingredients do not combine readily, the bottle should be well shaken just before applying. The remedy should be put on immediately after burning. It is cooling and healing, but is by no means meant to take the place of a physician in the case of a very bad burn or scald.

Several owners, while waiting for their horses the other afternoon, were discussing ways and means of protecting horses from the troublesome fly. Quite a seasonable subject at this time. One man said he used a strong decoction of smartweed. This he applied to the animal's legs, neck and ears, and found it good for a day. The owner of a bay said he used concentrated

oil of laurel, while a man who drives a team of blacks said he used oil of tar. Another formula spoken of is made up of one pound of asafoetida, a half pint of vinegar and one pint of water. Several of them, however, expressed their unwillingness to ride behind a horse covered with this mixture. But, notwithstanding this, it is entirely harmless, as are all the other fluids mentioned.

The past month has seen several very interesting tests made at our shop, one of the most important being a trial of The Laffitte Patent Welding Plates, a recent French invention, now being handled in this country by F. R. Phillips & Sons Co. of Philadelphia. These plates come in sheets 4 by 8 inches by about $\frac{1}{4}$ inch thick and are composed of a somewhat brittle substance through which runs a sheet of thin wire gauze that acts as a binder. The plates are creased into squares so as to be easily divided according to requirements. In service their action is rapid and in each of the trials gave an exceptionally clean, strong weld. No special preparations were made for these tests; for instance, fires that had been used for other work were employed. The object of this was to test the plates under the same conditions existing every day in the shop. In one case, that of making and welding a twelve-inch band of angle iron, usually a most difficult piece of work, the joint was welded quickly and easily (one heat being quite sufficient) and in such a manner as to have the joint barely discernible. Spring steel was also welded together with no trouble. In order to give the plates a most thorough test with tool steel, a broken Wiley and Russell $\frac{3}{4}$ -inch tap was jump welded to an old lathe tool $\frac{3}{4}$ by 1-inch stock. The shank of the tap was placed in the fire, heated and slightly upset. The piece of lathe tool was then heated and a slight depression made in it with the pene end of the hammer. A piece of the welding plate was then laid over this depression and when slightly fused was pressed into the hollow. A good red heat was now taken on both pieces. With the flat piece laid on the anvil, the tap was jumped on to it, the weld being made easily and without undue haste. The pieces thus welded were then reheated, placed upon the anvil and struck with the sledge in an effort to break the weld. Both the tap shank and flat piece were bent but the weld could not be parted. Pounding cold did not start any break at the weld. The boys were much interested and the boss expressed himself as greatly pleased with the showing made by the plates.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

The Best Hoof Parer.—Will some brother tell me which is the best hoof parer? I wish to get one.
C. F. ROBERT.

A Receipt for Welding Axles.—Will some one give me a good receipt for welding very fine axles?
P. C. PRINGLE.

Tempering Stone and Granite Tools.—Will some brother tell in the next paper how to temper stone and granite tools? I would like to know.
AN A. B. READER.

Moulds for Casting Brass.—Will some brother smith please tell me of what moulds for casting brass are made? We want to make brass castings.
POLZER BROS.

Applying Canvas to Wagon Tops.—Will some brother smith kindly tell me how to put canvas on ice wagons and all such rigs that use canvas in their construction? As a rule the canvas gets slack after a month or so.
GEO. E. BRIERLY.

Making Jail Doors.—Will some brother smith please send in a diagram and explanation for the next number as to the best way of making a jail door? I have never made one before but will in the near future.
J. F. SCHURLE.

Drawing the Temper Out of Files.—Will some smith, through the columns of THE AMERICAN BLACKSMITH, explain a reliable



METHOD OF USING A LAFFITTE PLATE FOR A SCARFED WELD.

method of drawing the temper out of steel files and other things of like character so that I can make a good cutting tool from them?
P. C. PRINGLE.

Hammering a Circular Saw.—I would like to receive instructions, through THE AMERICAN BLACKSMITH, on how to hammer a 54-inch circular saw, eight and nine gauge. I have hammered a five and six gauge saw all right, but I have failed on the other so far.
A. F. BOARDMAN.

Steam versus Gasoline.—If you have plenty of fuel and plenty of water handy, would you rather have a steam boiler and engine, or a gasoline engine? I have a steam boiler with which I run my band saw, etc. I have never used a gasoline engine and want the opinion of the craftsmen upon this question.
V. J. HILDRETH.

Tempering an Irregular Spring.—Some time ago I had a puzzling job—it was to make a pair of springs for an organ, but I could not temper them. They were flat and V-shaped. They were to run the pedal back up after it had been tramped down. I would like to have some advice from some of the older blacksmiths upon this job.
CHAS. B. GEIGER.

Making the Flare on Carriage Seats.—In reply to the question on carriage seats by "New Beginner" will say, the simplest rule I know of is, first bend the back of the seat to the desired flare. Then with a square take the width of the board on the blade and the height on the tongue. The latter gives the mitre cut for flaring corners.
M. A. FOSTER.

Tempering Gun Springs.—I forge my springs from 8-inch square cast steel, and when dressed up, I heat them red so they will turn white when dipped in warm water. I have a pile of sound oak bark burned down to coals. I blow the ash off this pile, lay the spring level on the glowing coals and watch it. When the spring turns to an ash color I take it off. When it is cold I oil it with some good oil and put it in the gun.
J. L. DEFEE.

A Voice From Indian Territory.—I wish to tell you that I cannot get along without THE AMERICAN BLACKSMITH. Some time ago I made a pair of tongs as described by

L. E. Phifer. They are O. K. Here is a partial list of our prices:

Shoeing	\$1.00 to	\$1.50
Old shoes, per set of four .....		.80
Welding buggy axle .....		.75
Welding buggy spring .....		.50
Resetting buggy tires, per set		3.00

PARKER & CLARK.

An Appreciative Letter.—I have read Mr. Perrin's articles in THE AMERICAN BLACKSMITH with much interest for some time. Also they have been of good use to me. In the November issue of THE AMERICAN BLACKSMITH, he gives a treatment for "Seedy Toe." I found use for that the next day after reading it. A horse was brought to me which had "forged" suddenly, and in a week of livery work had worn its right hind hoof clean through the wall, from toe to coronet, until blood was drawn and the hoof totally divided. Right there was use for Mr. Perrin's bar shoe with the shell protector. I made a bar shoe and drew out of Norway iron a shell reaching to the hair, but left room to pack with pine tar and tow. This same horse was base wide and interfered behind, striking at the quarter, and after trying several methods, stopped him by shoeing perfectly plain, no toe or heel calks. This horse has been worn out by too long, hard livery drives, and has little action.

P. P. GREENE.

Some Missouri Prices.—My shop is 20 by 40 feet. I use all hand machinery, but am going to put in an engine in the spring. Our prices are as follows:

Shoeing, new shoes.....	\$3.00
" old shoes.....	1.60
Setting buggy tires.....	2.00
" wagon tires.....	1.60
Pointing plows.....	.50 to \$0.75
Wagon tongs.....	2.50
Cutting down wagon.....	7.50
" buggy	6.00
New tires, wagon.....	8.00
" " buggy one inch	5.00
New plow lay, 12 inch.....	3.00
Lister lay.....	3.00

Other work in proportion. J. P. HEATH.

A Bright Item From Massachusetts.—I enjoy your paper very much and usually look for it before it is due. I wish you a large measure of success. Business has not been very brisk in our section the past winter, but we are all thankful that "Pandora" kept the little genius hope a prisoner. We all live more or less on hope, and while it may be a "good breakfast but a bad supper," it is a pretty good scheme to hitch your wagon to the star of hope and keep hammering. L. A. WRIGHT.

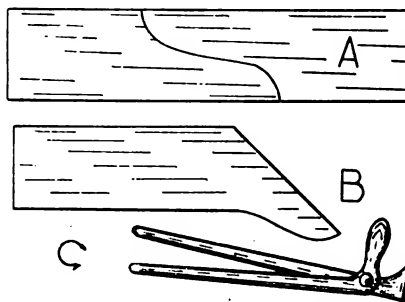
Tempering an Anvil.—In answer to Mr. J. W. Courtney's question about how to temper an anvil and what to use in tempering, will tell him my way, and I think it is the only correct way to do it. I take the anvil to the bank of a stream that has lots of running water and fasten chains to it so that it can be handled. I then build a fire around it, and when it is at a good cherry red heat all over I throw it out into the stream. The temper that you get will be excellent. J. S. BARTON.

Sharpening Toe Calks.—In answer to Bert Cooper's query as how to sharpen toe calks, will say I draw all of the calks from the back. If the calks are short and stubbed, which they often are in resetting, I turn them up against the hardy block and with a few short blows start them out. Then with the same side up take them on the horn of the anvil and finish. When drawing a calk from the back the shoe is never out of shape as in the old way. It will require quite a little practice to do this fast. THOMAS J. TRANKLE.

To Repair a Cylinder Jacket.—In answer to C. Arnold's query about a flux or solder

to repair a cylinder jacket, will give my soldering receipt. Dissolve zinc in muriatic acid until the acid has dissolved all the zinc it can. Then take from this five parts by measure, and add to it four parts of alcohol and one part of glycerine, so as to have one half of muriatic acid and zinc and the other half alcohol and glycerine. Have the parts to be soldered clean and free from dirt and grease and paint with the solution. Then apply the solder. Use a hot iron to melt the solder and then apply some more acid. This will give the very best results if directions are followed. I would ask Brother Arnold to kindly let us know if he is successful. R. S. HENRY.

Making Plow Lays.—In answer to Brother G. L. Thomas' query on plow lays, will say in making plow lays I take a piece of pasteboard and cut a neat pattern of lay. Then I cut my steel according to this pattern and then make my bar. I take stock, the size the plow calls for, as there are different widths and thicknesses. I measure from the point to the heel of the plow and cut accordingly with a cold cutter, as this is blunt and gives the right bevel. I always cut from the right side. Then I heat the bar and stick it fast to the point of the lay, get it in shape and weld. For welding I use pulverized borax and sand. I never put anything but sand along the bar. I leave my bar about a



HOW TO MAKE A PLOW SHARE.

$\frac{1}{4}$ of an inch wider than it should be when finished; this is to allow for shrinking. I temper only from the cutting edge and back about $1\frac{1}{2}$ inches. To temper I heat to a low red and plunge the steel into the slag tub. E. C. COSS.

How to Make a Plow Share.—In answer to Mr. G. L. Thomas' query, how to make a plow share, will say, first have a clean fire of good coal and use plenty of powdered borax. You are not very likely to burn plow steel or iron if you keep it wet with borax, unless you deliberately try to do so after you fit the bar. Commence welding at the point of the share. Take a good soft heat at the point and make a good weld as far as you can. Then take another heat and weld the remaining part. To cut a share from the slab, punch as shown at A, and then cut. Then take one of the shapes and bend it as shown at B. Draw the edge and sharpen. Now level the inside edge to fit the frog and landside. Fit the share and bar to the plow and then weld as directed, using a pair of tongs made as those shown at C. These tongs will clamp the bar and share tightly together. Set the bar a little ahead to allow for welding. The bar will stretch about $\frac{1}{4}$ of an inch. I have no trouble welding shares by this method. CHARLES HARRIS.

An Interesting Gas Engine Talk.—I have been running a shop at Bristow, Maine, for the past six years. I have a six-horse power gasoline engine with double cylinder, which arrangement, I think, is very convenient. For instance, I can run two forges, the drill, trip hammer and emery wheel with one cylinder. I also have a

feed grinder, a corn sheller and elevator and a bolster which I can run at the same time by connecting my other cylinder. Both cylinders work on the same fly wheels, making an explosion at each revolution when required. I have my engine mounted on a low truck and have a wood saw attached to it, which in the winter nets me quite a little. I charge one dollar per hour for wood sawing. I can also grind about thirty bushels of corn per hour. I expect to put in a band saw soon and then I think I will have a pretty good outfit. Power in a shop is an excellent thing. Doing custom grinding is quite profitable, and with the selling of feed it keeps two hands and myself quite busy. CHAS. B. LANE.

Repairing Sarven Patent Wheels.—Take out all of the spokes and clean and straighten the flanges if they are bent or nicked. If the hub is greasy throw it away, because the glue will not stick to greasy wood and you cannot do a good job. If the hub is all right, get the exact size of the spokes so that they will require but very little trimming. Now saw the tennons so they will not quite touch the boxing when they are driven up. Now see that the tennon is a little larger than the mortise, so that it will drive tight. Have the spokes the same thickness so as to fit snugly between flanges and also to fit against one another from the hub or shoulder to outside of flange where they separate. Dip the ends of the tennons into good glue and put a little in the mortise. Then drive every other spoke in. Drive to a gauge so that the spokes will be straight on the front side, then set them aside. When the glue has set treat the other spokes in the same manner. Now let the wheel dry and then put in the rivets. Cut the tennons and put on the rim, leaving a little opening at the rim ends so the wheel will not be rim bound. Now set the tire on tight. The job is now done. W. D. BOETTLER.

Erratum.—Mr. A. Smith of Wisconsin, writes to point out that the stock problem on page 28 of the November issue was not correctly solved. Mr. Smith figures out that the volume of one inch of $2\frac{1}{2}$ -inch round stock would be 3.976 cubic inches, whereas it requires $2\frac{1}{2}$ inches of $1\frac{1}{2}$ -inch stock to equal the same volume.

The general rule mentioned in the article is correct, that is, divide the volume of your finished forging by the sectional area of your given stock, and the result is the length to cut off. The error lay in the formula, and calculation of the volume of the pieces illustrated. The correct formula should be $L \times D^2 \div d^2$, where L is the length and D the diameter of the finished piece and d the diameter of the given stock. Solving the particular case given, which is illustrated by the accompanying diagram, $1 \times 2\frac{1}{2} \times 2\frac{1}{2}$ divided by $1\frac{1}{2} \times 1\frac{1}{2}$ equals $2\frac{1}{2}$, or in other words, a $2\frac{1}{2}$ -inch length of $1\frac{1}{2}$ round stock will upset to a one inch length of $2\frac{1}{2}$ stock.

Knee Striking.—Having read Mr. B. W. Mathews' article about knee striking horses, I conclude that his ideas are, as a rule, about as near right as can be figured out, but I find in my experience that there are cases in knee striking where all rules fail, and in such cases one has to resort to experiments in order to obviate this particular fault. Mr. Mathews' way of using the shoe marked C is, I think, about the best to overcome the difficulty. However, I find in my experience that the inside weight usually answers the purpose.

In forging I find that a light toe and a heavy heel does about equally as well as using a square toe of equal thickness. Where the toe of the foot will allow, let

the hoof project over the shoe while using a square toed shoe.

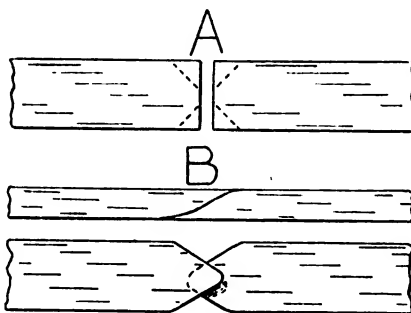
However, one never gets too old to learn, and, after all, the New York Shoer's idea is in reality the best that has yet been suggested for forging and interfering. His advice is to let the same man shoe the horse every time. GEO. F. WHERRY.

How to Solder a Cracked Cylinder Jacket.—In answer to Mr. Arnold's inquiry how to solder a cracked cylinder jacket, will say I take for granted that it is a double walled gasoline engine, and will explain how I soldered one that had burst the cap and cylinder by freezing. First, I thoroughly cleaned the parts, both inside and out, and as the cap was sprung so that one edge stuck out farther than the other, I heated it slowly in the forge to a dull red color. Then I screwed it up very slowly in the vise in such a way as to force the joint back to place and still have it in a position so that I could drill three $\frac{3}{8}$ -inch holes in the crack. I then cut them with $\frac{1}{4}$ -inch thread and fitted them with a $\frac{1}{4}$ -inch threaded rod and sawed the rod off even with the outside. Then I opened the vise and found the crack smooth and even. I then filed a little $\frac{1}{4}$ -inch furrow on each side of the crack, brightened and cleaned it thoroughly and soldered it up with common half and half solder. Cast iron is quite difficult to solder, but when once firmly tinned, the battle is as good as won. To do the soldering take an ounce of muriatic acid in a two-ounce bottle and add to it one teaspoonful of salomiac. Drop slowly into this thin pieces of zinc till the acid will dissolve no more zinc. Wind a cotton string on a stick for a swab and apply the acid where you wish to solder. Warm your cylinder and work with a slim pointed soldering copper that is pretty hot; rub the solder in the crack groove and on each side until it is thoroughly tinned. I use a gasoline blow torch to heat soldering irons. When thoroughly tinned, put on more acid and solder and turn the flame of the torch onto the soldering iron while on the cylinder, and you can that way get just as much or as little heat as you wish and solder the casting so it will be smooth and as good as ever. The essentials of a good job are a clean, bright surface to solder on, good acid, a clean, well tinned soldering iron and the right heat. W. H. CASE.

A Difference of Opinion.—I don't mean to pick on any of the readers on what they explain through the columns, but in looking over the March number I came across Brother L. Van Dorin's idea on tire setting, which started with "A Short Cut in Tire Setting." Now it may seem so to him, but it is not as exact as running the wheel with a traveller or tire wheel, as Brother Van Dorin explains it. This he is trying to do away with, and he goes on to say that he is surprised that so very few smiths use it or know of it, but I saw this method used when I was serving my apprenticeship. My boss always used it. But even when I was a boy I did not approve of it. What I wish to say about Mr. Van Dorin's method is, it is not as good as running your wheel with the traveller and staying by it. I think any smith will side with me here if he has read the article in the March number. The difference between the two ways of setting tires is this. In Brother Van Dorin's method we have to allow for two heats, and in the old way we just allow for one. When he marks his tire A, B, C, D, as in his drawing, and intends upsetting it until his dividers fit at A D, instead of B D, he already has it a heat smaller than his marks, because when he marked it at first it was cold, and then by putting it in the fire it expanded. He then upset it until the desired size, not allowing for this heat.

Now before he proceeds any farther he has his tire the desired size with a draft of one heat in it. When it cools he has the draft of another heat, which makes two heats to allow for, as I stated in the beginning. As for using the traveller, you have no marks to go by when the tire is cold. You simply get the size of your wheel and upset the tire until it is the desired size, then you have only one heat to allow for. Now I wish some of our readers would look into this, and if I have a wrong idea about the matter, I would like to learn differently, for I am still young with only six and a half years at blacksmithing, but I have thus far met with very good success. C. CRAIG.

Welding a Spring.—I am glad to see that another reader knows how to weld a spring—I refer to the one who welds it without splitting or riveting or taking stick heats. I have welded them in one heat for more than twenty years. So let me have a final word on welding springs. Buggy springs or wagon springs will cover the case, in fact I don't do anything but buggy work. The accompanying illustration is a flat view of a broken spring. I drive the corners back, as shown by the dotted lines. Then I scarf the two ends, so that when placed together they will look like B in the engraving. Now weld up in one heat. If you do not get all well down, a light



WELDING A SPRING.

borax heat will do to finish. As there is no appreciable waste in welding a spring, in fact it is imperative that there be scarcely any, it is never necessary to put in a piece or to stretch the spring at the folded end or eye. R. O'HEARN.

A Few Practical Pointers.—A young mare was brought to me some time ago to be shod. She was driven on an express wagon by a hard driver, and her knees were skinned and bleeding. The owner asking if I could help her, I said yes. So I made a pair of shoes and welded a paddle on the outside toe of $1\frac{1}{4}$ -inch stock about one inch long. As he wanted to sell the horse in the spring, and as the knees had healed up and haired over, I took off the paddled shoes and replaced them with a pair, square on the inside toe with the outside full. I filed the hoof slightly round on the inside corner at the toe so the square toe of the shoe could not be seen. She never hit while they were on and the man sold her at a good price.

When you break a horse of anything, and all the soreness, if any, is gone, it is not so hard to keep the animal in shape. This winter I was called upon to shoe a horse that interfered very badly on the hind pastern. The other shoer had been cutting the hoofs down on the side, until nothing was left for me to do but make a pair of shoes. So I made them with the outside light and thin and inside high and heavy. I placed no calk on the inside, but calked the outside to make it level. It did the work. I removed these shoes in about eight weeks and found the horse

entirely well. But the owner left me and took the animal to where she got cut up. That's the way a man is used sometimes for doing a good job.

One man says to drain the water from the gas engine five minutes before stopping in cold weather. I never drain my engine and never have any bother. I have had it over two years and it never was out of water and has never cost me a cent except for oil.

About a nut step—that's a small job. Take a piece of stock and make a square band a little narrower than the nut. Shrink it on hot, and then with a light hammer rivet the edge of the nut and it will never come off. Bend the pad up so it is over the top of the point band and near the spokes, so it will not get knocked off. I have put on very many and have not had any trouble. A. M. SPEER.

Calculating the Horse Power of a Steam Engine.—I am a blacksmith, running a shop of my own, and as I receive a lot of good information from THE AMERICAN BLACKSMITH, I recommend it to every one who follows this line of business as the best paper that he could take.

I am trying to obtain all the knowledge I can about steam engines and would like an answer to the following question about the horsepower of an engine. I would like in the first place to know just what a horsepower is. Then supposing we have an engine whose piston has an area of 50 sq. inches, and it runs at 225 revolutions per minute with a stroke of 10 inches, and a boiler pressure of 100 pounds. I would like some short method of finding the horsepower from these figures. Would an engine with the above specifications deliver 18 horsepower? T. W. W.

Answering the above question, power is defined as the rate of doing work, and one horsepower is taken as doing work at the rate of 33,000 foot pounds per minute, or in other words, a horsepower is the same as lifting one pound 33,000 feet in a minute, or lifting 33,000 pounds one foot in a minute, the rate of doing work being the same in either case.

A simple rule for finding the horsepower of a steam engine is by the following formula: $P \times L \times A \times N \div 33,000$.

P is the mean effective pressure in the cylinder in pounds per square inch. It depends upon the boiler pressure, the back pressure and the cut-off. If the cut-off is one-tenth, that is, if the steam is admitted into the cylinder from the boiler for only the first tenth of the stroke, a very rough approximate of the mean effective pressure is .3 of the boiler pressure, in general cases. For one-fifth cut-off multiply the boiler pressure by .45 to get the mean effective pressure; for three-tenths cut-off multiply by .6; for four-tenths multiply by .7; and for one-half cut-off multiply by .8. This is only a very rough approximation. In practice the usual way of finding the mean effective pressure is by an indicator, an instrument drawing an automatic diagram from which the pressure at any part of the stroke may be determined.

Assuming a cut-off of one-fifth, and applying this rule, we would get a mean effective pressure of about 45 pounds per square inch, in the case of the engine that Mr. T. W. W. asks about.

L is the stroke in feet, in this case $\frac{10}{12}$. A is the area of the piston in square inches, which in this case is 50.

N is the number of single strokes, or double the number of revolutions per minute, or here 550. Multiplying these four factors together and dividing by 33,000, gives an indicated horsepower of about 25. The indicated horsepower is the work which is done in the cylinder, and is some-

what greater than the work which the engine will deliver to the fly wheel on account of the friction in the engine itself. If any of the brothers are interested, I should be glad to tell something about steam engines and their principles of operation. W. B. A.

Random Remarks on the March Issue.—Page 101—"A neat, clean shop makes a lasting impression on customers." I personally know of one shop of this description which made such a good impression on a wheelman, who stopped there to borrow a wrench, that he looked up its owner and gave him a good paying position several years afterward. On the other hand a poorly-kept, slouchy-looking shop is a poor recommendation. I had occasion to recommend a blacksmith for a good position not long since. One was mentioned to me whom I had known some years ago. He is a good workman and well liked by his customers, is obliging, good-natured and sober. But a visit to his shop showed that he does not pick up his tools when through with a job and does not use his broom often enough. I once had to discharge a good workman because he could not be taught to pick up his tools, but always had to hunt them up when they were wanted.

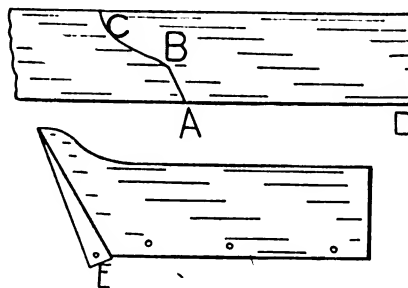
Page 102—Speaking of ornamental wrought iron work, the editor says: "The popular feeling which is growing constantly in favor of this kind of work, makes it very profitable and gives the clever smith an opportunity to prove his skill." For the smith who can find customers who appreciate good work, there is something in this line in the way of profit; but the general public cannot tell wrought iron from cast iron, and would rather have a set of cast irons at so much a pound than to pay a reasonable price for a really good job of wrought iron work. Let us hope that the feeling in favor of good work is growing, for we like to put in our spare time in doing this kind of ornamental work. So far, the writer has disposed of most of his product in this line by giving it away as wedding and Christmas presents. On this same page, the andirons by Mr. Googerty and his boys are (like all the work from the same source) very beautiful. This reminds me that I have a stand in my front room made after the pattern of one published in *THE AMERICAN BLACKSMITH* about two years ago and designed by Mr. Googerty. Under the heading, "A Valuable Invention Lost," the subject of tempering copper is discussed, and something is said of the fame and fortune awaiting the one who rediscovers the lost art. Why should we want to make tools of copper, which costs more than steel? Mr. J. M. Fix, what a good name for a smith, by the way, says some good things about perfection in the craft. While we must not expect to reach perfection it will do no harm to aim at it. What he says about welding is good. It is but very little more trouble to make a weld that will not show at all than to leave the end sticking up so that the job is disgusting to a good workman.

Page 104—John W. is right in what he says about working clay without much moisture in it. It is the pounding which makes it solid. His descriptions of the two repair jobs are worth reading. We can all appreciate the last clause in his article. We can all recall some jobs that were "done more for accommodation than for profit."

Page 109—Mr. L. Van Dorin's short cut in tire setting is an old story to many, but no doubt will be new to some. I believe that many of the things which are not new to the old fellows ought to be told for the benefit of the younger brethren.

Page 117—In the plan of the shop, the rip saw and pony planer are too far apart. They should be side by side so that the operator can stand between them and will not have to do any travelling to get from the saw to the planer. In our shop the carpenter can rip a piece of timber and by turning half way round he can place it in the planer or joiner. J. W. DREW.

How to Make a Plow-Lay.—The method of clamping the short bar to the stock of the plow is all right as explained in the last issue, but from a slab of plow steel I cut the slope differently. By my method you do not have to bother with an extra point, and the throat can be filled out much better. This is an important part for the wear of the lay. I lay the slab on the plow, allowing D, as in the engraving, to be at the proper place at the back corner of the mouldboard. See that the slab is snug along the side of the mouldboard. Then on the outside of bar and beginning at A mark to B. Then take the slab off the plow and mark from B to C in the shape of a long double curve. Now heat to a light red and cut at the mark. (I sometimes take a center punch and punch the main points before heating.) When cut I take hold at the back part of the lay and, while it is hot at B, strike it on the anvil, backside down, and force the point or the part between B and C to come edgewise around in line with the bar.



HOW TO MAKE A PLOW-LAY.

Now curve the lay and be careful to see that it fits on the rests and also on the bar which is clamped to the plow. Sometimes I have the barside of the lay a little thicker, as it will then stand more heat without burning while welding to the bar. Now we are ready to draw to an edge. Draw the point C out, long in shape, so as to turn below the iron bar. Weld first at the point and then on the back. Mark through the bolt holes of the plow and centre punch to give the drill a start. The hole E cannot be drilled from the mark so I make a cross by holding the lay edges to the eye and centre punch. I generally use square shouldered bolts, for they are easiest and best to put in. In order to get the square hole in the lay I use a square punch after the holes are reamed to fit. W. R. GARMAN.

The Making of a Plow-Lay.—I will endeavor to give our young Brother G. L. Thomas some information regarding plow lay making. As every blacksmith knows, there is such a variety of steel now on the market that it is a difficult matter to give instructions regarding the heat. Experience and practice are the best teachers I know of, and by close observation only can the degree of heat for a given grade of steel be learned. I have worked on plows as a specialty ever since I handled a fire, and I am very seldom wrong in the judging of a piece of steel and the heat it will stand. The higher the grade of steel the less it will stand. As the young man in question is a blacksmith he, of course, knows this.

But to come back to the subject, I first examine the frog of the plow and see that it is in line, that is, I place the blank lay on the bar, temporarily, to see if the point of the frog in that position would make the plow run too deep or not deep enough, or to take too much land or not enough. If I determine it would be too deep, I raise or bend the end up. This is done in order to avoid making the quarter bar too narrow or the lay too thin, as it nears the point to avoid deep running. If it is too high I lower it a little. The above applies only to plows where the frog is long and lays next to the quarter bar. Where the frog is only a piece of iron doubled in, this, of course, could not be done. Fit the quarter as it will set on the finished job, except that it should stick $\frac{1}{4}$ to $\frac{1}{2}$ of an inch below the bar of the plow, as it settles that much in welding. Have the top curve so it will conform with that of the mould board and on a straight bevel with the high edge on the outside or bar side of the plow. The point end should be wider and brought to a feather edge. Clamp it from the bottom side to the frog with a pair of tongs. Now take your blank lay and upset the edge heavily, so as to make the bar and shape heat alike. Have the curve in the shape a little straighter than that in the bar, and fit it $\frac{1}{4}$ of an inch larger than the bar, as this will shrink slightly in the welding and will also leave a surplus with which to make a nice square corner. Do not get too much bevel on the bar or it will turn out and the inside will not weld good. After the shape has been fitted properly, put on your plow clamp, slip a small piece of metal about $\frac{3}{8}$ of an inch thick between the point of the bar and the shape, and the pressure of the clamp coming between this point and the wide end of the quarter bar will hold the two pieces in place much better, and they will not spring in welding. Screw the clamp up tight and have it as near the point as possible to keep it from getting hot. You can now take your tongs off. Place your bar and shape in a good clean fire and commence welding at the heel. All the draw will run to the point and make less trouble when you go to finish. Set this heat slowly and thoroughly till about the welding point, and then apply borax and sand, or any other flux or compound you desire, and then heat to the highest possible degree without injury to the metal. Now place your work squarely on the anvil with a pair of plow tongs, which grasp as close to the bar as convenient. These you hold while your helper opposite, with a similar pair, catches the point and presses down lightly. You then give a succession of hard, quick blows with a 3 or 3½-pound hammer. Now knock your clamp off and repeat the operation until within 2½ or 3 inches of the point. Then shrink your steel edgewise at the top, to the width of the bar, with a feather edge tip. Now turn it edgewise on an angle of 45 or 50 degrees to the right, commencing at the end of the bar. Then turn this back and under and it will give you the angle on your point. Now take a heat, weld top and bottom at once and finish and drill your holes. If you take an old rasp or file and clean off all the scales while hot, you will find it easier in keeping your work smooth. If you cut a small piece from your shape and try a heat on this before you weld your lay, so as to ascertain what heat it will stand, you will find it a great help. The soil here is light and sandy, and any kind of a plow will scour, so I use Star No. 2 bars, as they weld better than any brand I have in mind. I find that a job with a shear well fitted is half done and that the first heat is worth three afterwards. G. S. BURGHART.

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Prices Current — Blacksmith Supplies.

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All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

$\frac{1}{2}$ in., round or square; Iron, \$2.80; Steel, \$2.90
$\frac{3}{4}$ in., " " " 2.40 " 2.50
$\frac{1}{2}$ in., " " " 2.20 " 2.30

Flats—Bar and Band.

$\frac{1}{2}$ x 1 in., Iron, \$2.90; Steel, \$2.90
$\frac{1}{2}$ x $1\frac{1}{2}$ in., " 2.20 " 2.30
8-16 x $1\frac{1}{2}$ in., " 2.40 " 2.40

Norway and Swedish Iron.

$\frac{1}{2}$ in., round or square, \$4.90
$\frac{3}{4}$ in., " " 4.50
1 in., " " 4.30
$\frac{1}{2}$ x 1 in., " 4.90
$\frac{1}{2}$ x $1\frac{1}{2}$ in., " 4.20

Horseshoe Iron.

For No. 1 shoe, $\frac{3}{4}$ x $\frac{1}{2}$ in., \$2.50
For No. 2 shoe, $\frac{1}{2}$ x $\frac{3}{4}$ in., 2.50
For No. 3 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.50
For No. 4 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.50

Toe Calk Steel.

$\frac{1}{2}$ x $\frac{3}{4}$ in. and larger, \$3.00
--

Spring Steel.

$\frac{5}{8}$ to 1 in. Rounds, Op. Hearth \$3.00, Crucible \$5.00
$\frac{1}{2}$ to 6 in. by No. 4 gauge to $\frac{1}{2}$ in. Flats " 3.00, " 5.00

Carriage Bolts. (Net Price per Hundred).

$\frac{1}{2}$ x 2 in., \$0.54	$\frac{3}{4}$ x $2\frac{1}{2}$ in., \$0.82
$\frac{1}{2}$ x $2\frac{1}{2}$ in., .58	$\frac{3}{4}$ x $3\frac{1}{2}$ in., .96
$\frac{1}{2}$ x 3 in., .62	$\frac{3}{4}$ x 6 in., 1.31
5-16 x 2 in., .65	$\frac{3}{4}$ x 4 in., 1.70
5-16 x 3 in., .75	$\frac{3}{4}$ x 6 in., 2.10

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Heave, Cough, Dis-temper and Indigestion Cure will effect a permanent cure for the ailments named. Recommended by veterinarians and owners. Every drug-gist in America has it or can get it.
\$1.00 per can, of dealers, or express prepaid.
THE NEWTON REMEDY CO., TOLEDO, OHIO.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

WANTED.—Agent in every machine shop for New Wiet-Goehe caliper gauge, \$20 worth of tools for \$2.00. Double your daily wages while selling them and still work at your trade. Big profits. For particulars address, **WIET-GOETHE COMPANY, Sacramento, Cal.**

I CAN SELL YOUR BLACKSMITHING BUSINESS (with or without real estate) no matter where it is or what it is worth. Send description, state price, and learn my wonderfully successful plan. **W. M. OSTRANDER, 109 North American Bldg., Philadelphia.**

FOR SALE.—Blacksmith shop containing good set of tools, stock and everything needed. In good location in Grundy County, Iowa. For full particulars address, **T. H. PORTER, Dike, Iowa.**

FOR SALE.—Patent No. 758,800, Improved lap ring or open link, cold shut. Will sell cheap, outright or on royalty; need money. Am looking for capital to patent several inventions. Will assign part in each patent. Address **FRANZ WENKE, Fort Wingate, New Mexico.**

FOR SALE.—General blacksmith shop, tools and dwelling, in town of 25,000 people. For further information address **L. O. DODGE, Norwich Town, Conn.**

V STANDS FOR **VULCAN;**
POWERFUL AND STRONG,
IF YOU USE

Vulcan Horse Nails
YOU CAN NEVER GO WRONG.

THE QUALITY OF VULCAN
HORSE NAILS IS FULLY GUARANTEED

THE FOWLER NAIL CO.
SEYMOUR, CONN.
SOLE MANUFACTURERS



WANTED AND FOR SALE—Continued.

WANTED.—An all around carriage painter.
M. G. MURPHY, Brookville, Pa.

WANTED.—Position by first class man. Want good steady job year round. Address,
N. POST, Perham, Min.

FOR SALE.—Blacksmith shop and dwelling. Good location for horseshoer and jobber. Address
A. SCHUMACHER, Manchester, Mo.

WANTED.—A partner. Must be sober and an all-around blacksmith, with or without means. Address,
B. RANNESBERGER, Chaseburg, Wis.

FOR SALE.—Blacksmith and wagon shop. Best wheat country on earth. Work for five men. All improved machinery. Snap if bought in thirty days.
J. H. KLOSSEN, Inman, Kans.

WANTED.—Painter to learn sign painting; new method of cut cardboard letter patterns; send stamp for circulars and sample.
E. T. LITTLEFIELD, Adams, N. Y.

WANTED.—Superintendent for well established wagon plant in East. Must have experience and capabilities to handle a large and modern factory. Address, TAPPING & RIEDEBURG, Milwaukee, Wis.

FOR SALE OR RENT.—Two story smith shop, 20 by 30; stable 16 by 28 and six room dwelling. In village in Pennsylvania gas district. Good reasons for selling. For particulars address,
J. E. KEVERLINE, Coal Hill, Pa.

New Books

THE NORMAN W. HENLEY PUBLISHING CO. has just issued a new boiler room chart 14x28 inches, showing in isometric perspective, the mechanism belonging in an up-to-date boiler room. The glossary gives the names of each piece that is shown.

A MEMORIAL EDITION of Grinnell's Hand Book on Painting has just come to our notice. This neat little book is a practical treatise on house, sign and carriage work and contains many useful hints for the young painter. The author not only describes good methods for treating most every kind of job, but also tells of the common practices of the careless workman, who cannot make a success at the trade.

The book was written by the late V. B. Grinnell, a practical and well-known painter who died April 6, 1904, at the age of seventy-one.

ALTERNATING CURRENT MACHINERY, written by Wm. Esty, head of department of electrical engineering, Lehigh University, has been published by the American School of Correspondence. This new volume has been prepared with a view of giving the beginner and the so-called practical electrician a working knowledge of alternating current apparatus so that he may know how to install and operate it correctly.

The author has endeavored to make all complicated descriptions as simple as possible, so that they can be understood without much study and accompanying the text are many diagrams and illustrations, all helping to make the book very interesting.

ANOTHER INTERESTING VOLUME published by The Norman W. Henley Publishing Co., is the new book entitled "American Tool Making and Interchangeable Manufacturing," a subject of great interest to every worker in metal. The art of tool making occupies a prominent part throughout the whole book and is treated in a style especially suited to the Machinist, Tool Maker and Blacksmith.

The book has been compiled by Mr. Joseph V. Woodworth after years of experience. Accompanying the text are over 600 illustrations, made from drawings by the author, helping to make clear the complicated parts of many inventions.

The book contains 560 pages and is handsomely bound in cloth of red.

SOUND, SOLID STEEL TALK is found in The Scientific Steel Worker, by O. A. Westover. The writer is a practical blacksmith and expert steel worker and explains thoroughly the art of working steel. The book is written in a manner so as to be easily understood making it a most practical and up-to-date manual for the every-day smith. It contains tables, formulas and recipes, besides many pointers which are usually acquired by the craftsman only after years' of experience and patient toil. The book contains chapters on the following subjects: judging, forging, welding, annealing, hardening, tempering and brazing, and with the twenty-four pages of mechanical tables makes one of the most practical books upon the working of steel. The volume is well bound in substantial blue library cloth and will be sent postpaid upon receipt of \$1.50.

Trade Literature and Notes

THE STANDARD BALL AXLE WORKS tell us that they have taken charge of the old Daphin Axle Company's factory and are running it entirely on Standard Ball Axles.

MANY BEAUTIFUL HALF-TONES of New Badger punches and shears are shown in the latest catalogue of the Badger State Machine Company of Janesville, Wis. A copy of this interesting booklet will be sent to any address upon request. Write for it—it's well worth the trouble.

THE SPARK THAT COUNTS is the unique title of a small catalogue issued by the Induction Coil Co., Milwaukee, Wis. This catalogue deals with their improved "I. C. C." coil for producing jump sparks in gas and gasoline engine work. It will be mailed to any address free upon request.

AN INTERESTING and very readable booklet of eight pages has just been received from the Luther Bros. Company, or North Milwaukee Wis., illustrating in attractive shape the uses and advantages of their Fire-Fly (non-heating) Sharpener, which is a small hand-driven grinder with carborundum wheel.

A NEAT LITTLE FOLDER has just been received from the Grinnell Manufacturing Co., of Grinnell, Iowa, describing and illustrating the mechanism of their "modern" power hammer and detailing the many uses to which it can be adapted. Three diagrams show how easily it may be adjusted to different lengths of stroke.

CRESCENT HIGH GRADE AGRICULTURAL Steel Shapes is the subject of a recent catalogue just received from the Crescent Forge & Shovel Company, Havana, Ill. In it are illustrated and described the various types of shares, moldboards, landside points, cultivator blades and other agricultural shapes manufactured by this company. Free upon request.

BALSAM OF MYRRH is said to be an excellent remedy, indorsed by all who use it. The Hanford Mfg. Co. of Syracuse, N. Y., claim that it will counteract the effect of poison from rusty nail wounds, remove proud flesh and gangrene and will stop a fresh cut from bleeding almost immediately, healing it in a very short time. A remedy of such quality should be in every shop.

ACME ENGINES AND BOILERS are made by the Rochester Machine Tool Works, of Rochester, N. Y., are fully illustrated and described in various pamphlets issued by them. The Acme engine is built in sizes from $\frac{1}{2}$ to 7 horsepower, or combination sets with engine and boiler together can be furnished in two, three and four horsepower sizes.

THE ELECTRIC WHEEL CO., Quincy, Ill., report selling quantities of axles and steel wheels abroad. They state that there is a large demand for these goods throughout Australia and that their wheels in every case have given satisfaction. This company makes a point of catering to the blacksmith trade, furnishing wheels or axles, or any parts of a wagon that may be required.

THE E. T. BUHL MANUFACTURING CO., of Cleveland, Ohio, are now making the Reynolds Axle Gauge, which is enjoying much popularity. This gauge is well liked because it is easy to adjust and is also a very accurate tool. On page XXX of this issue, the E. T. Buhl Mfg. Co. offer to send one anywhere on a thirty day free trial. This firm must feel confident that they have a winner, else they would not do this.

A NEW FIRM, the United States Horse Shoe Company, of Erie, Pa., have just entered the market. They send us their catalogue of horse and mule shoes showing the various styles which they are at present manufacturing. This firm has just completed the erection of a new and modern plant for turning out a full and complete line of shoes designed to meet the requirements of the most discriminating farrier.

AN IMPROVED STEEL THIRD SEAT is being manufactured by The Geo. B. Freeman Mfg. Co. of Racine, Wis. The frame is made of polished steel bars, finished in black enamel. The joint is upset to double the size of the bar, giving much additional strength and allowing the use of a steel pin about twice the length of those used in most other steel seats. This seat is adapted to many purposes, being used as a carriage third seat, camp chair, hassock, Etc.

A GOLD MEDAL and Special Diploma has been awarded by the Louisiana Purchase Exposition at St. Louis, to the Mietz & Weiss Oil Engine, a manufactured by August Mietz, 128 Mott St., New York City. This, together with the "Medal of Excellence," awarded by the American Institute, 1897; highest award at the Paris Universal Exposition, 1900; gold medal, Pan-American Exposition, 1901, and gold medal, at the Charleston Exposition, 1902, indicates the merit of this engine.

THE EDMONDS-METZEL MFG. CO., Chicago, have put on the market a neat combination wrench and thread cutter. The wrench grips from 1" to 1½" diameter and can be used on any form of nut or pipe without adjustment. The thread cutters are furnished with pump rod, carriage bolt, English, Foreign and Whitworth threads.

This clever tool has met with great popularity among mechanics and shop owners and many hundreds are now in use.

THE QUALITY OF A SHOEING JOB depends largely upon the kind of nails used by the smith. The shoe should fit firmly. Horse owners are often inconvenienced by the animal throwing a shoe, which is due, in a great many cases, to the use of an inferior quality of nails.

The Standard Horse Nail Co. of New Brighton, Pa., claim that "New Standard" horse nails are the best driving and best holding nails manufactured. They take special care to produce nails uniform in length, breadth, thickness, blades and points, and guarantee their quality. See page XXXVI for special prices made to shoers.

THE TRUSTEES of the Technical School for Draughtsmen have been authorized by the Car-

riage Builders' National Association to offer two prizes to such two pupils who make the best record for efficiency and progress in the work of the school during the current year. These prizes consist of free tuition for one season and board of the winner for thirty weeks at five dollars per week, being equal to a total sum of one hundred and fifty dollars. One prize is open to the corresponding class only, and the other to the entire school of the day, the evening and the corresponding classes. The awards will be made by the trustees, October 1st, 1905, when the prizes shall be available.

A NEW INSTITUTION OF LEARNING was founded recently at Freeport, Ill., when the Wenthe Correspondence School was organized, for the purpose of teaching railroading to young men who wish to enter the service.

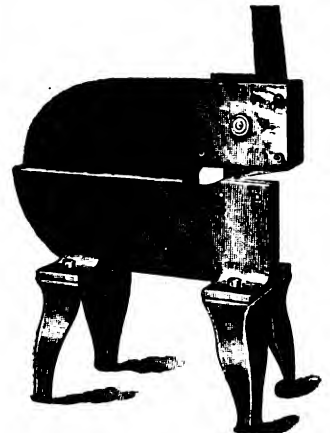
As a rule, applicants for positions as brakeman, fireman or telegraph operator are almost totally ignorant of the many duties they will be called upon to perform and it is the object of this school to teach rules, signals, practical working and operation of steam railroading, so as to qualify their pupils for the position they seek.

Most of the officers and instructors connected with this new school are men of experience in railroad life, several being, at the present time, actively interested in the larger roads. The school also has an employment bureau and seldom fails to place its graduates in good positions.

MORE STARRETT TOOLS is the self-explaining title of a catalogue just received from the L. S. Starrett Company, of Athol, Mass., listing a number of new tools recently placed upon the market by this firm. This company are manufacturers of all manner of high grade tools, such as micrometers, gauges, scales, rules and other measuring devices. Among other tools illustrated and described in the new catalogue is a double-lip wood countersink, self-centering and so constructed that it will clear itself of shavings in any kind of wood, cutting a smooth round hole. It has a further advantage in that it can be sharpened from the inside with a file. Another interesting little tool is a steel tap wrench which is designed to hold tools of any shape,—taps, reamers, drills, with shanks of any shape, square, round, octagonal or oval. Interested parties should write for copy of the above catalogue.

A HORSE CLIPPING NOTE. It is a shame to use a horse hard when he has on his long heavy coat. Kept under artificial conditions, he has no chance to comply with the demands of nature, as the wild horse has, and often he is worked so hard that he sweats freely and then stands all night wet to the skin, using up, to dry his hair, heat that should be going to recuperate his tired body. If, however, the clippers were run over him, he would dry off in twenty minutes and then stand warm and comfortable all night. Up-to-date stables are equipped with a clipping machine. The Chicago Clippers, manufactured by the Chicago Flexible Shaft Co., 186 Ontario St., Chicago, are having a large sale in this country. This machine has just been patented in the United States, Canada, England, France, Germany and Russia, and is a new departure over the old style belt machines, as it does away with all unnecessary weights, belts, stands, balance wheels, etc. It is very simple in design, and is made on the same principle as the chainless bicycles.

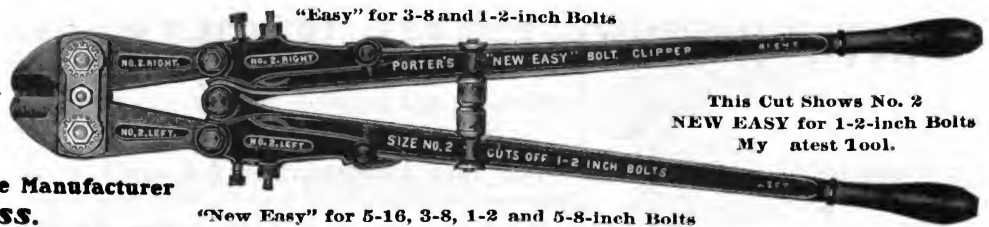
THE ACCOMPANYING ENGRAVING illustrates a slitting shears manufactured by the Walker Tool Co. of Lansing, Mich. This machine is built to be used by sheet metal workers, in general. It will slit 4-inch plate any width or length. The company has adopted Whiteley's cam motion. This makes the machine powerful and very easy to operate. The machine is nicely designed and mounted on legs of a height to be most convenient to the operator. The cam is made of the best tool



steel, 2½ inches in diameter and the bearing is four inches long. There is also a bearing on the opposite side from the lever or in the cap, making the cam very rigid even under the heaviest strain. Solid tool steel is used for the shear blades. The levers are held in a malleable head and two levers are furnished with each machine for light and heavy work. The company will take pleasure in answering any questions asked regarding this machine.

PORTER'S THE BEST BOLT CLIPPERS

H. K. PORTER, Sole Manufacturer
EVERETT, MASS.



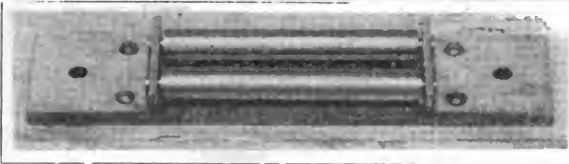
"New Easy" for 5-16, 3-8, 1-2 and 5-8-inch Bolts

This Cut Shows No. 2
NEW EASY for 1-2-inch Bolts
My atest Tool.

2 RIVETS and 1 HAMMER

are all you need to fasten our **Roller Reach Irons** on any farm wagon. Make the wagon turn easily, because you don't have to grease the sway-bar.

20 Cents Each.
10 or 25 in Box.



W. T. DAUM & BRO.,
AUSTIN STATION, CHICAGO.

LOTS AND LOTS OF BLACKSMITHS

have sent us in one or more new subscribers to the paper. **HAVE YOU?** If not, why not secure one new subscriber to THE AMERICAN BLACKSMITH during May, and let us extend your subscription six months as a reward? What do you say?

AMERICAN BLACKSMITH COMPANY,
BUFFALO, N. Y.

The Blacksmith's Friends.

Patented May 10, 1904.

Banner Welding Compounds

Welds at a low heat, does not fly. Saves time and fuel. **Guaranteed** to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the **Banner Brands**.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.

CORTLAND SPECIALTY CO., Sole Manufacturers, CORTLAND, N. Y.



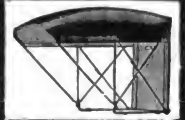
A COMPLETE LINE OF Carriage Tops

and Trimmings

Seventeen different grades of tops. All good ones. Prices right.

Ask for No. 5 Catalogue

C. A. HALLIDAY, 24 Cedar St. Oneida, N. Y.



Fac-Simile Letters

FOR
Circularizing and Follow Up Systems

Look like the original and bring results. Furnished complete with names filled in or ribbons to match.

LERNER - BEAN CO.,

363 Washington St., BUFFALO, N. Y.

RICH'S NEW

ARTISTIC
HORSESHOEING



MY LATEST BOOK

ARTISTIC HORSESHOEING

SHOULD BE IN EVERY UP-TO-DATE SHOP.

THE PROGRESSIVE SMITH

will find it invaluable in his every day work. A practical, scientific treatise on improved methods of shoeing. Special directions given for correcting faulty action in trotters and for shaping shoes to cure different foot diseases. 284 different styles of shoes illustrated and explained. **Cloth bound, 217 pages, Price \$2.00.**

AGENTS WANTED.

Prof. GEORGE E. RICH, 239 S. Main St., AKRON, OHIO.

A FEW OF OUR SPECIALTIES

THE GOGEL BLOW PIPES THE GOGEL FIFTH WHEELS OUR NEW FLARE BOARD IRONS

Will braze your rubber tire wires quicker and better than any other apparatus known to the trade. Strong, durable, safe and reliable flame, always under operator's control. Saves time and money.

Will outwear the best two any smith can forge and do not cost one quarter as much. They need no hole through axle to put on. Easily fitted. You don't need a high arched ft. axle to get level reach.

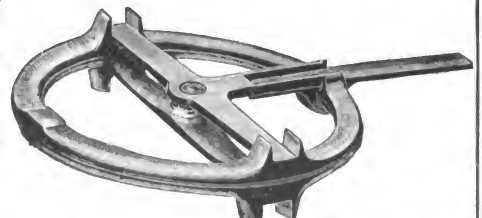
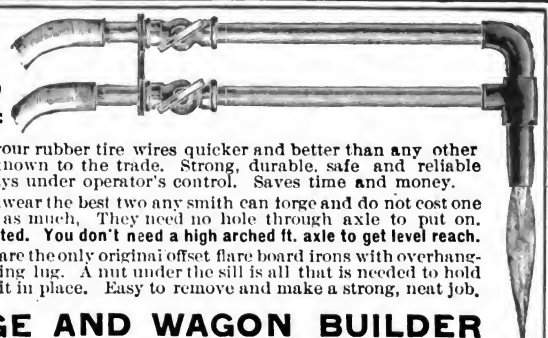
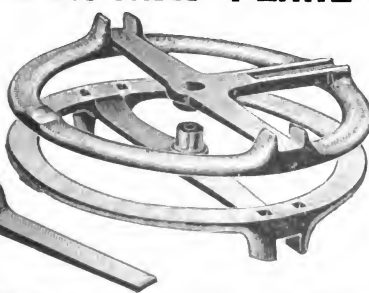
are the only original offset flare board irons with overhanging lug. A nut under the sill is all that is needed to hold it in place. Easy to remove and make a strong, neat job.

EVERY CARRIAGE AND WAGON BUILDER

Is invited to write for our New Interesting Circular. Sent free to any address upon request.

THE
GOGEL MFG. CO.

234-238 S. Erie Street,
TOLEDO, OHIO.



ANOTHER OPPORTUNITY IS GIVEN

our many subscribers to extend their subscriptions **FREE OF CHARGE.**

This offer was made some months ago and found such popularity that we have decided to extend it.
The proposition is to give you

SIX MONTHS' CREDIT on your own subscription for each new subscriber you send in.

Furthermore, we give you every possible aid in the matter. Should you be interested in getting "the most up-to-date smith paper" free of charge, write for particulars.

**The
American Blacksmith**
P. O. Drawer 974
BUFFALO, N. Y.

LAFFITTE WELDING PLATES

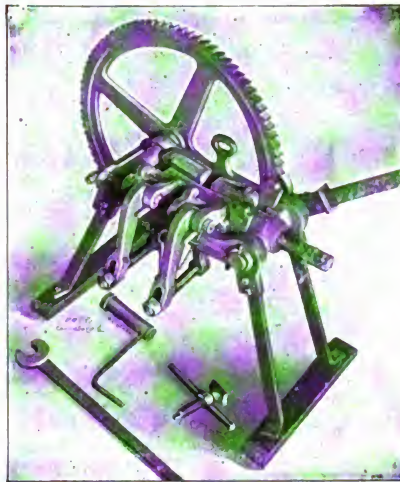
Make Difficult Welds Easy.

Produce an absolutely homogenous joint at a low temperature. Weld Tool Steel. Repair steel castings.

No Departure in Method Required.

Send for Sample and Particulars.

F. R. Phillips & Sons Co.
Penna. Building, Philadelphia,
SOLE AMERICAN AGENTS.



Wolfe's Cold Tire Setter

Patented

The most complete machine for the purpose on the market

Simple in construction, easily operated. Quick adjustments, prompt results. Takes a short hold or long one, as desired. Grips the tire firmly, keeps it always in line. Double acting, quick for light tire, powerful for heavy. Dishing device with every machine. No cold tire setter a success without it. **DO NOT BUY** without investigating this. The latest and best. Write for particulars.

HENDRICKS MFG. CO.
Manufacturers and Selling Agents, Wanesboro, Pa.

Less Work and More Money

A GUARANTEE MADE TO USERS OF

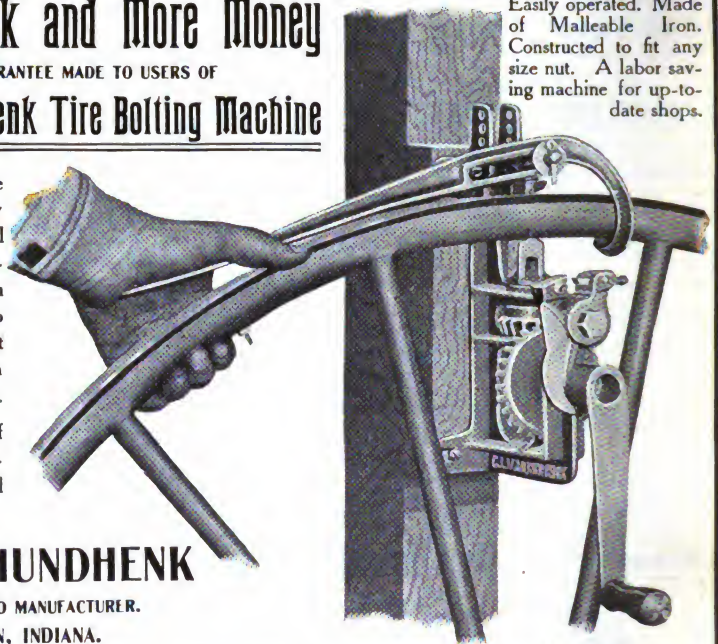
The Mundhenk Tire Bolting Machine

Mundhenk's Tire Bolter is the Only Machine that Will Successfully Remove all Burrs, Run Them On or Clip Ends off Tire Bolt Perfectly Smooth in 2 minutes' time.

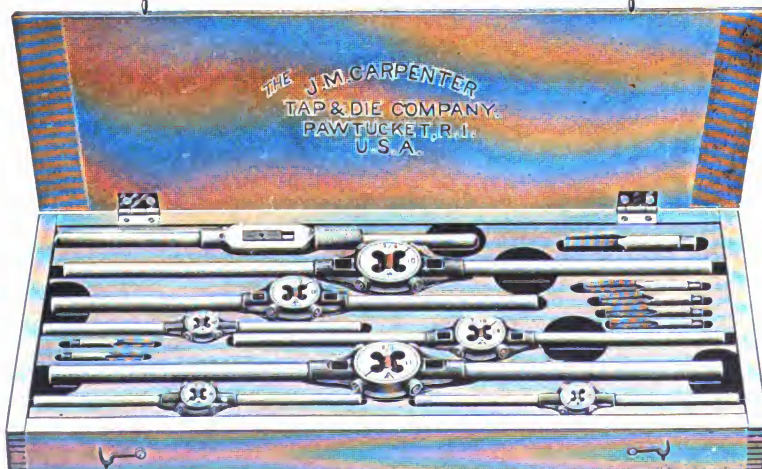
Send for one of our interesting circulars and let us tell you all about it.

C. L. V. MUNDHENK

INVENTOR AND MANUFACTURER.
MARION, INDIANA.



Easily operated. Made of Malleable Iron. Constructed to fit any size nut. A labor saving machine for up-to-date shops.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

Send for catalogue

The J. M. Carpenter Tap & Die Co.

Pawtucket, R. I., U. S. A.



FOOT POWER HAMMER

A FOOT POWER HAMMER

The most convenient machine a smith could buy. Carefully constructed, easy to operate. Strong, Powerful, Durable. Requires no engine to run it.

Does a Wide Range of Work. Leaves Both Hands Free.

WE ALSO MAKE A SPECIALTY OF
BLACKSMITHS' PUNCHES

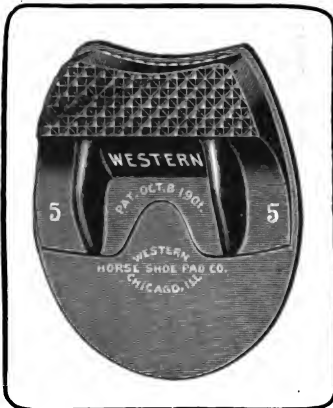
It will pay you to write for our Bulletins.

THE C. E. SUTTON COMPANY

TOLEDO, OHIO, U. S. A.



BLACKSMITH PUNCH



Do You Use Western Pads?

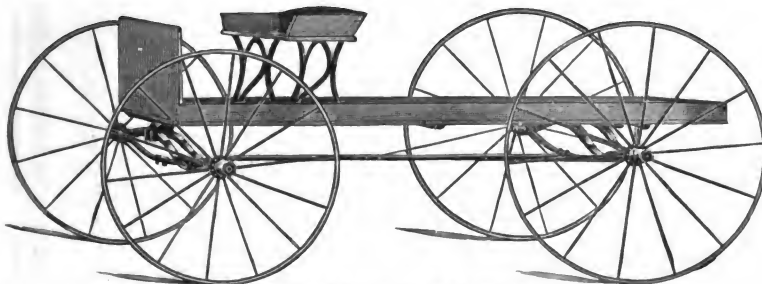
If Not, Why Not?

Did you ever stop to consider what the name "Western" means in connection with "Pads"? If you have not, we want to say right here, Mr. Horseshoer, that "Western" stands for "Quality, Design and Freedom from Freak Ideas."

Use Western Pads and be up to date

First Rubber Company

Sole Manufacturers
156-158 Lake Street Chicago, U. S. A.



Write for
Catalog
and
prices
on
full line
of gears.

PEERLESS MILK WAGON (Short turn)
FOSBURG SPRING AND GEAR CO., ROME, N. Y.



DOMESTIC
LIGHT
UNIT

For steady light and economical, noiseless operation, use the

FAIRBANKS-MORSE GAS OR GASOLINE ELECTRIC LIGHT PLANT

Fairbanks-Morse Gas, Gasoline and Oil Engines were awarded the Grand Prize and Four Gold Medals at World's Fair, 1904.

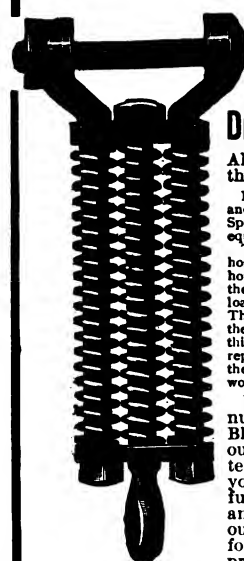
Cut out complete advertisement and send to

FAIRBANKS, MORSE & CO., Monroe St., Chicago, Ill.

Please send me illustrated Catalogue No. EL 487 Gasoline Engines. I may want..... H. P.
Engine to run.....
Name..... Street No.....
Town..... State.....

PATENTS that PROTECT
72-p. Book Mailed Free
R. S. & A. B. LACEY, Patent Att'ys, Washington, D. C.
ESTABLISHED, 1869.

WE WANT AN AGENT



in every city and town to sell

BEECHER

Draught Springs.

All wagon owners need them.

For simplicity, durability and usefulness, our Draught Springs simply cannot be equalled.

They act as a cushion to the horses' shoulders, they HELP horses START heavy loads, they assist in drawing the load after it is in motion. They prevent collar wounds; they save from twenty to thirty per cent. in harness repairs; prolong the life of the team and increase their working capacity.

We now have a large number of successful Blacksmiths acting as our agents—we have territory for more. Will you represent us? We furnish sample springs and printed matter to our Agents. Write us for our liberal agency proposition.

BEECHER DRAUGHT SPRING CO.
NEW HAVEN, CONN.

Be Sure you are Right, then go Ahead!

THE ROBERTSON

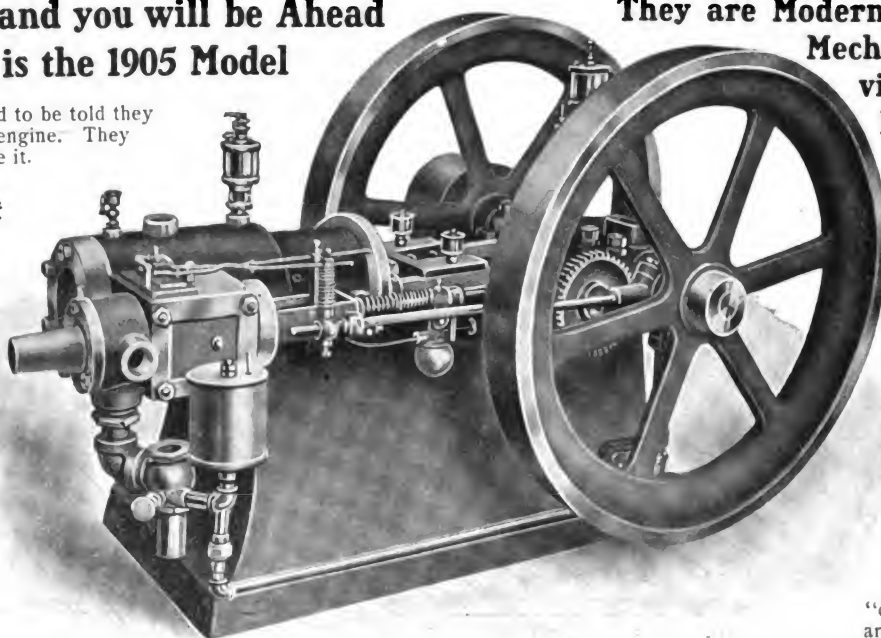
AUTOMATIC GAS AND GASOLENE ENGINES ARE RIGHT

**Buy One and you will be Ahead
This is the 1905 Model**

You don't need to be told they are a high class engine. They show it and prove it.

**Note that
Straight
Line
Piston
Feature.**

No undue pressure or wear on cylinder. Just like a steam engine, adds 75% more service to the life of the engine.



**They are Modern, Scientific,
Mechanical, Serviceable, and
Economical**

Yes, the igniter is perfect, the make and break type, and very simple. It only makes a spark when required. Controlled by the governor, no waste of batteries. Material and workmanship in their construction are the best.

**That's
Right**

They are not a "cheap" get up, they are good, in fact, they are the BEST.

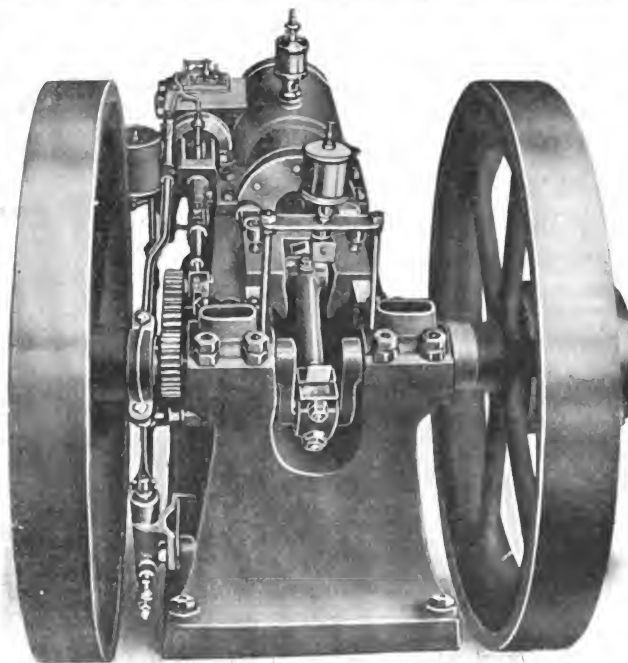
Made in Sizes 2½, 4, 6, 8, 10, 12½, 16, 20 and 25 H. P.

SOME SPECIAL FEATURES—Noiseless, Smooth, Steady Running, Handsome Design and Elegant Finish.

**See that Cross
Head with Bronze
Bearings for Wear
Adjustment.**

**No Joints or
Connections on
the inside.**

Have a look at the governor. It's all right. It regulates the speed. It cuts off the fuel in right proportion. Then again you can vary the speed instantly while the engine is running.



If you want the best and are the first to buy one in your district we have a very liberal offer, worth \$100.00 in gold to you. In answer to this, state what you want to run and say

**"Special for
May Offer."**

Our engines are all tested before shipped, each being fully guaranteed. You do not have to pay for them if they don't do as we claim.

Made only by the

ROBERTSON MFG. CO. Niagara St., Buffalo, N. Y.
High Class Engine and Tool Builders.

Columbian Hardware Co.

CLEVELAND, OHIO.

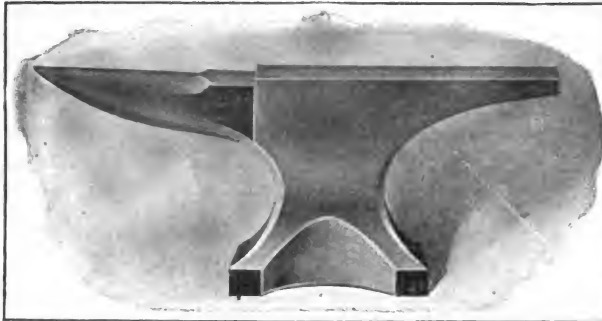
OUR ANVILS
are made of special ingot steel. Each one is protected by our written guarantee. Built to stand the test of long, severe service. Carefully constructed by the most skilled workmen. Their quality cannot be excelled.



OUR VISES
have jaws forged from one piece of special ingot steel and faced with high-grade crucible tool steel. Our horseshoers' vises are made to turn both calks at one heat on flat front jaw. Every vise carefully inspected before leaving factory.

COLUMBIAN ALL-STEEL ANVILS AND SOLID-BOX WROUGHT STEEL VISES
Are noted for their superior quality. Only first-class material and workmanship employed in their construction.

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about good wheels and good wagons that will save you a lot of work and make you a lot of money—the

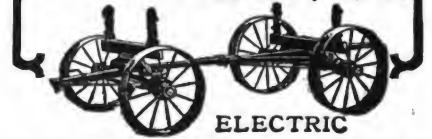
ELECTRIC STEEL WHEELS

and the

ELECTRIC HANDY WAGON.

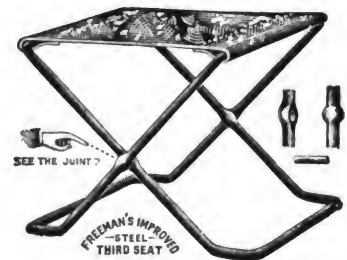
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FREEMAN'S
Improved Steel Third Seat



Superior to all other third seats on the market. The frames are made of polished steel bars finished in black enamel. The joint is upset to double the size of the bar, which gives great additional strength and allows the use of a steel pin twice the length used in other steel seats. It is impossible for the joint to give out or the pin to break. See the cut. It can be used as a carriage third seat, camp chair, hassock or child's chair.

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High Pressure Brand No. 2 Brazing Forge

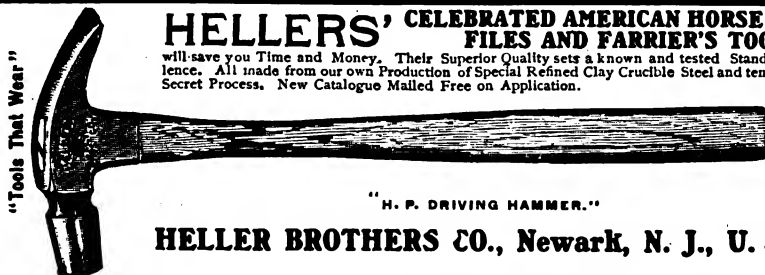


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will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



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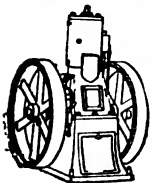
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BUFFALO TIRE UPSETTER 1905 DESIGN

Armor plate frame. The kind that don't break. Working parts of forged steel carefully machined. Fully guaranteed against repairs from breakage of frame for five years.

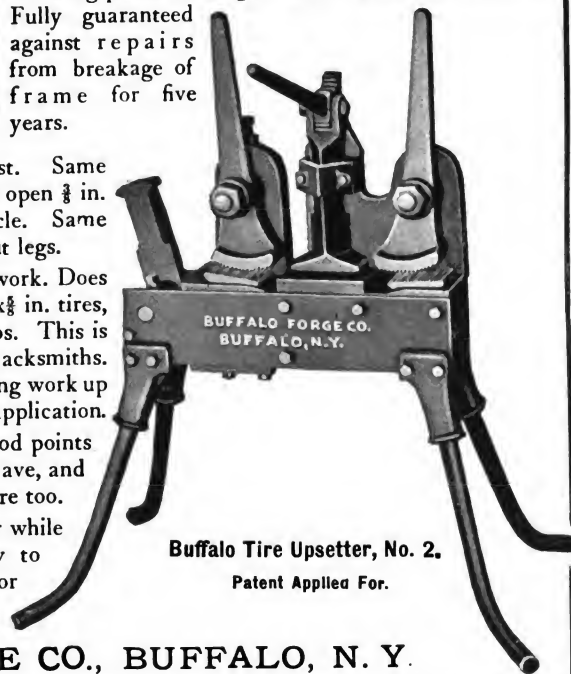
No 1. For bolting to post. Same upsets $1\frac{1}{2} \times \frac{1}{4}$ in. tires. Jaws open $\frac{3}{4}$ in. Takes as small as 7 in. circle. Same principle as No. 2, but without legs.

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Test this machine for all good points a tire upsetter is supposed to have, and you will find them all, and more too.

We will make it worth your while to be the first in your county to order the No. 2 size. Write for full details.

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ARE THE BEST.

Interchangeable thread—6 sizes.

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With 25 years' experience I consider your "Always Sharp" Calk

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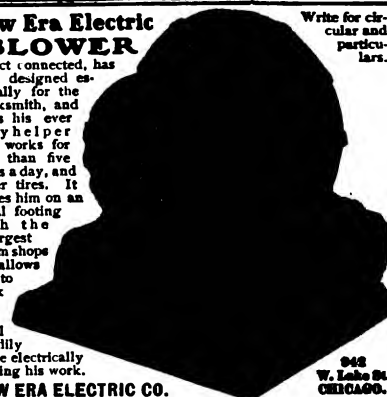
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Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

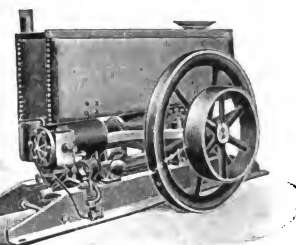
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No base required for stationary purposes. No water and gasoline connections to be made. Shipped ready to put down and run.



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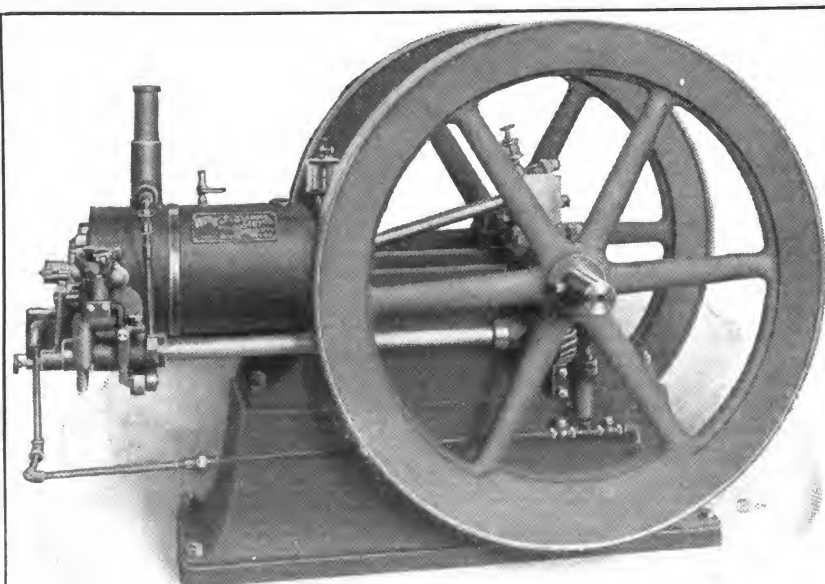
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Five H. P. Weber Engine for blacksmith, wagon and repair shops.

Our 5 H. P. Engine is especially adapted to smith shop work. As to their being reliable, ask any of our customers. They will tell you. Drop us a postal and we will send you a complete interesting catalogue.

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Durable and
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CRUCIBLE STEEL COMPANY OF AMERICA.

Braze Cast Iron with BRAZIRON CHEAP EASY

Opens up a new field of profitable work for every blacksmith and machine shop; mends broken machinery, cracked cylinders, anything of cast iron. Write for full particulars, prices and testimonials. Send 12 cents in stamps for samples of Braziron and our new flux. Sample sufficient for several jobs.

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Suitable for use on elliptic or semi-elliptic. Takes jolts and jars. Saves the vehicle and prevents breakdowns.

Made in { No. 1. For Springs 1 1/4 to 1 1/2 in.
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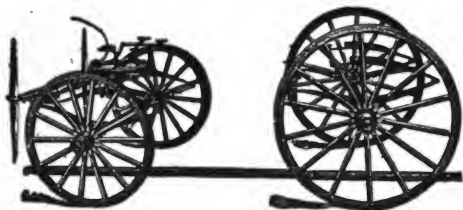
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12 (no 2 alike) 75c.



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1/4, 18c.; 1/2, 25c.; 3/4, 33c.;
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Pipe Reamers same price.



Full line of 1/4 oversize Taper Taps to fit all Standard Screw Plates.

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**Best
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8 inch, 45c. dozen; 10 inch, 60c.

Will prepay postage on any above goods for 10 per cent. extra. Do you want complete Tap List?

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Is what you are after. You want to know how to work steel at your forge. You desire the practical knowledge that will enable you to judge, forge, temper, weld, anneal and harden this most particular of metals. You want **Sound, Solid, Steel** talk, and you get it in

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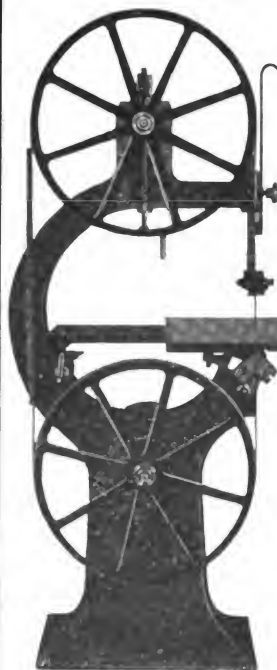
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27-INCH BAND SAW.

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Every Time and All
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The Perfect Power Hammer

Is an absolute necessity to every well equipped shop. It does the work quicker and more accurately than any other hammer manufactured

**HAS A VERTICAL STROKE
NO SIDE MOTION
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Does the widest range of work from the lightest forging to heavy axle welding.

We guarantee the best material and workmanship and will replace any defective part. Our broad guarantee holds good for one year.

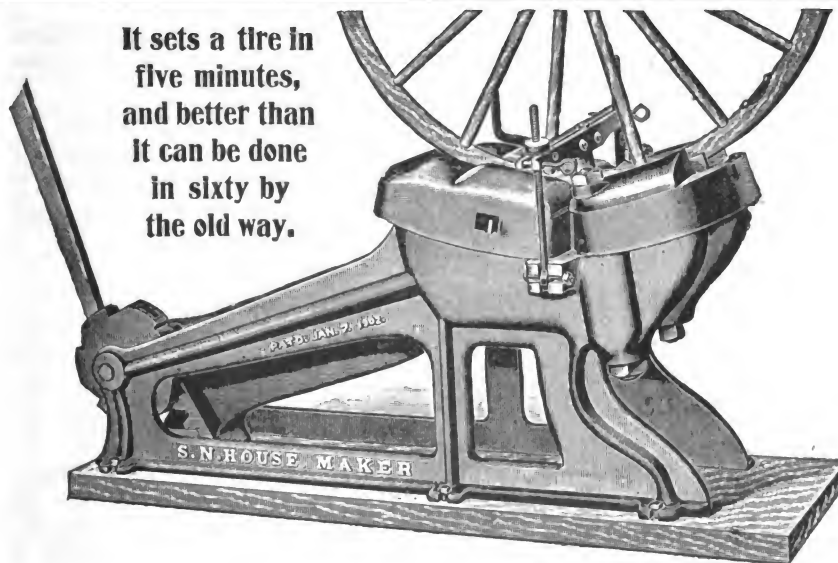
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THE HOUSE COLD TIRE SETTER

It sets a tire in five minutes, and better than it can be done in sixty by the old way.



Write for our new folder containing 200 testimonials that come from 42 different states. See what your neighbors say. We have 1400 of these machines now in successful use, and they are in every State in the Union. There might have been Cold Tire Setters made that were a failure, but you see it isn't ours. A great many of our customers have made from \$30.00 to \$60.00 clear profit in a day. Read what these two men say.

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DON'T BUY GASOLINE ENGINES

Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

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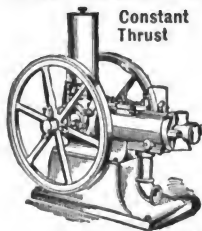
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Constant Thrust

STATIONARY and MARINE 1-60 H. P.

Adopted by the U. S. and Foreign Governments.

Most Economical and Safest Power known. Runs with common kerosene, distillate or fuel oils.

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For all Power Purposes. Thousands in use. Highest award for Direct Coupled Engine and Dynamo, Paris Exposition, 1900.

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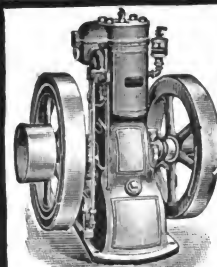
That will fit the spindle of your drill press, holding drills $\frac{1}{4}$ to $\frac{1}{2}$ in. inclusive, with reducer to $\frac{3}{4}$? Drills held by this chuck are much cheaper than drills with $\frac{1}{4}$ in. or $\frac{1}{2}$ in. shank. Simplest and cheapest chuck on the market.

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Little giants for power. Simple, durable, strong in every part. Easily operated. Economizers of time and fuel. KNEELAND ENGINES are the best power for small shops.

Made in Sizes from 3 to 6 Horse Power.

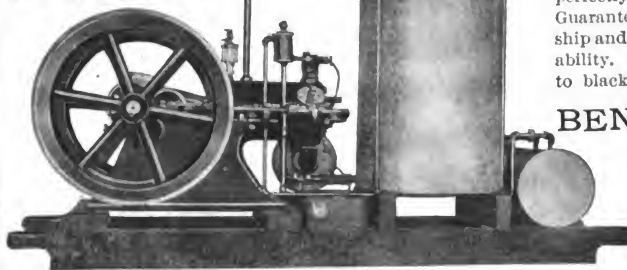
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2½ Horse Power



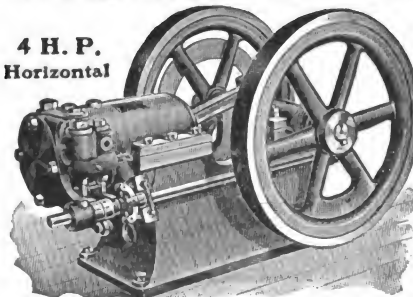
Simple in design, correct in principle, perfectly reliable, thoroughly practical. Guaranteed to be unsurpassed in workmanship and material, ease of starting and durability. Write for our special inducements to blacksmiths. Manufactured by the

BENTON HARBOR MACHINE COMPANY

Benton Harbor Michigan

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4 H. P. Horizontal



Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

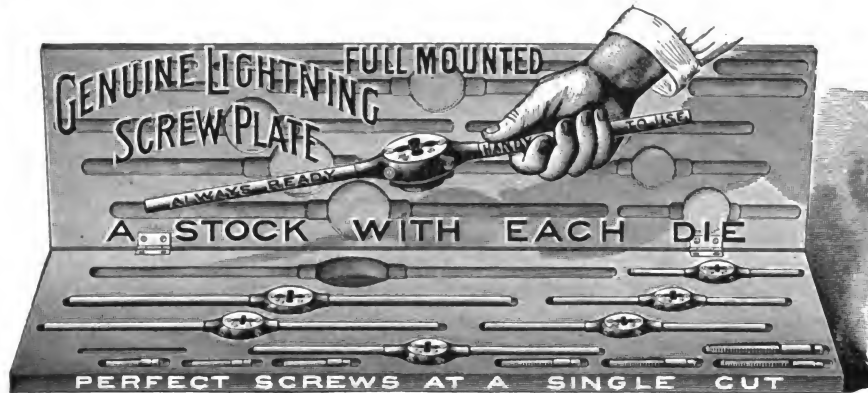
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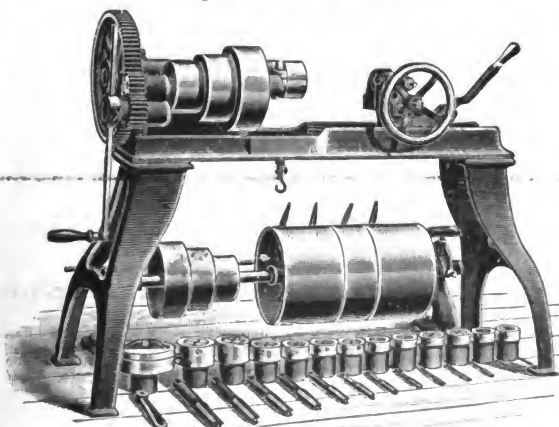
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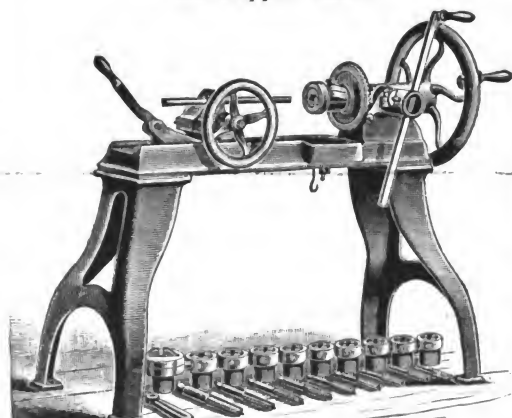
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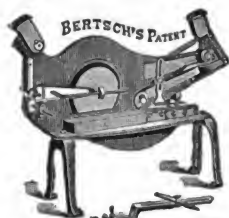
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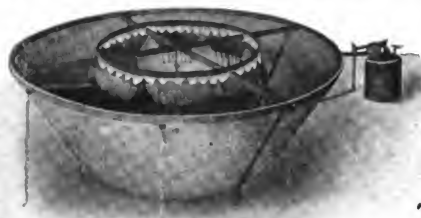
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PLOW SHARE AND OTHER STEEL SHAPES. BLANKLEY TUVERE IRON.

ADJUSTABLE TIRE HEATER

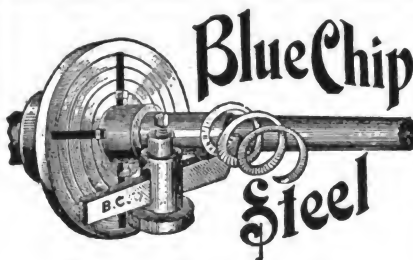


It will heat any weight of tire and is adjustable to all sizes. Will do it quickly and at small cost.

GAS AND GASOLINE MACHINES BOTH IN STOCK.

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Offices: Spitzer Building,
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Will turn off blue chips
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It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

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OLDEST AND BEST
GRINDING MILL MADE.

**STRONG,
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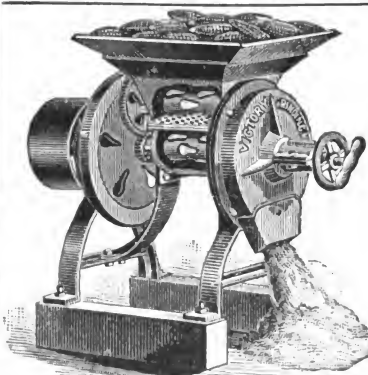
Especially adapted to grinding ear corn,
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Tools and Supplies for Horseshoers
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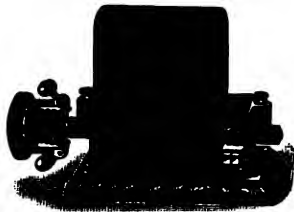
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In addition, it's the cheapest
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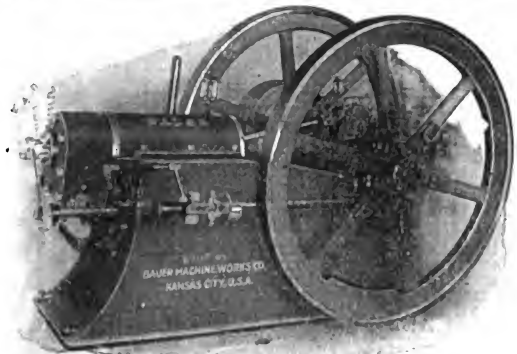


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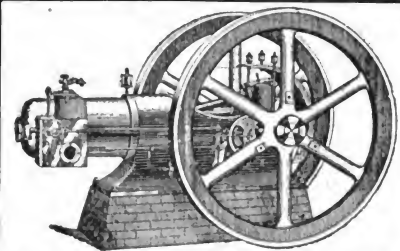
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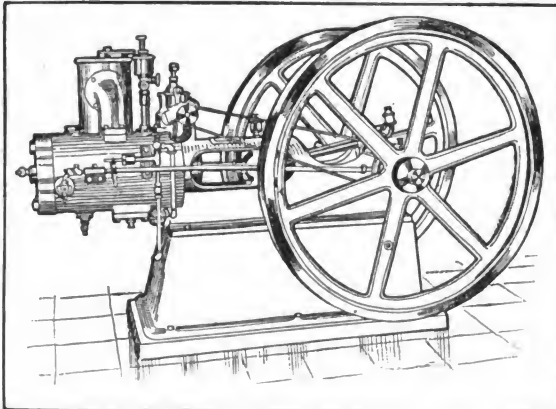
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2

— TO —

30

H. P.

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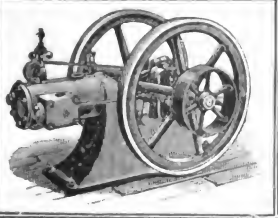
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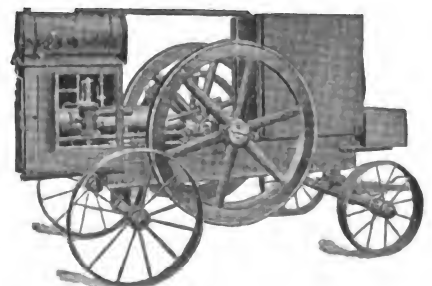
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Wheels, with Standard Cushion Rubber Tire On.

Size Tire	Height 36 & 38	Height 36 & 40	Height 38 & 42	Height 40 & 44	Axles
1 inch	\$18 75	\$19 00	\$20 50	\$20 00	\$1 90
1 1/4 inch	21 50	22 00	22 75		1 90

We can re-rubber your wheels, prices ranging from \$6.75 up
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Compressed Band Wheels, extra per set, 50 cents.

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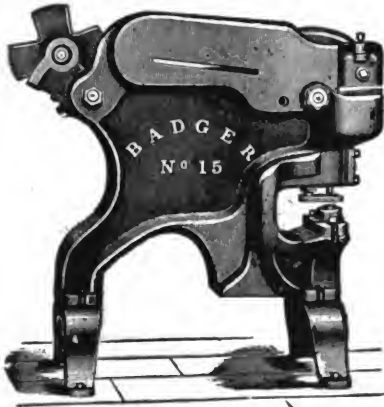
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No. 15 THE BADGER No. 15

Will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{5}{8}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.



Weight 800 Lbs.

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The Most Powerful Lever Punch and Shear Made.

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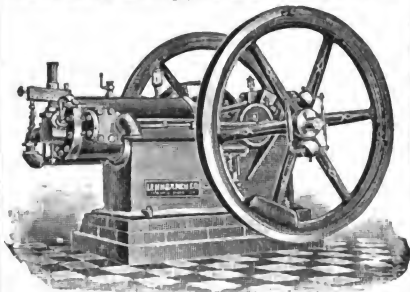
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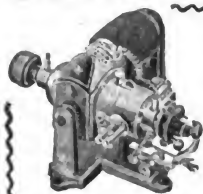
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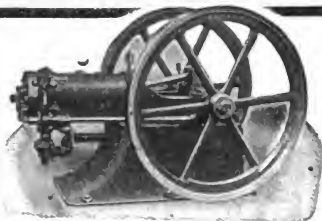
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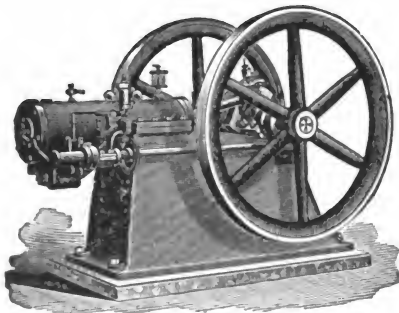
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Portable
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illustrates
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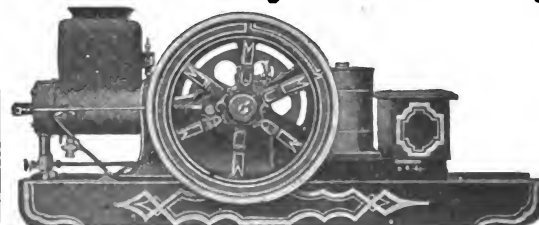
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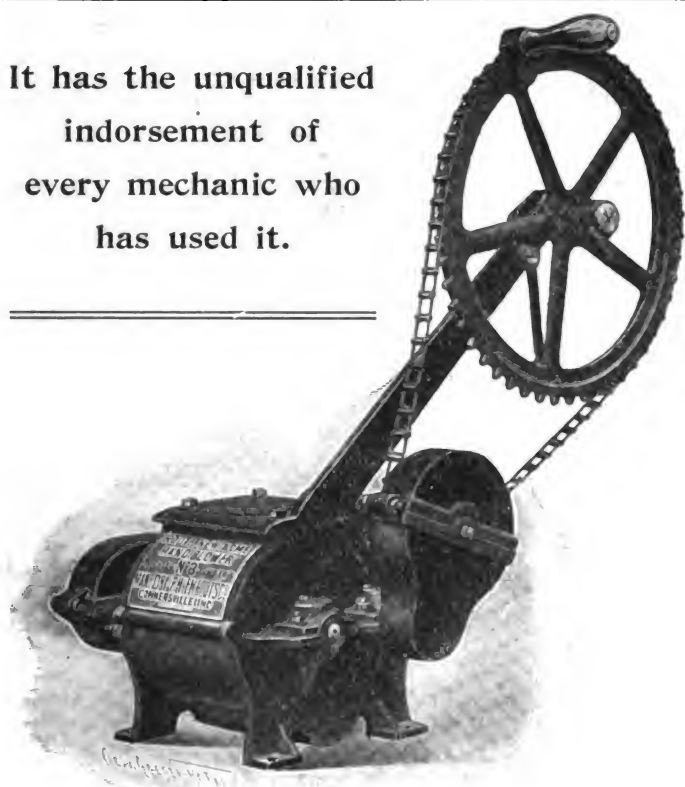
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For Blacksmiths

It has the unqualified
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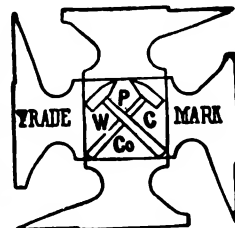
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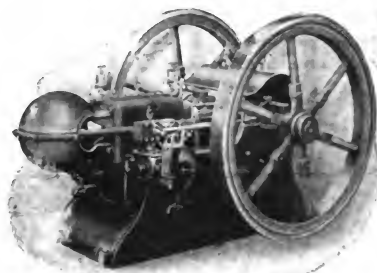
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Are Especially
Suited for
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Power.

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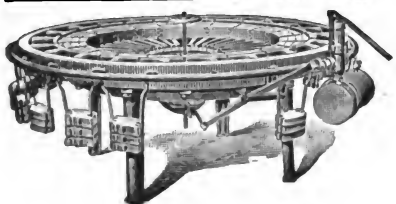
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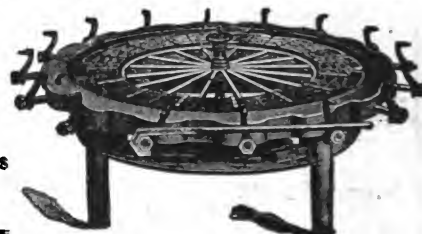
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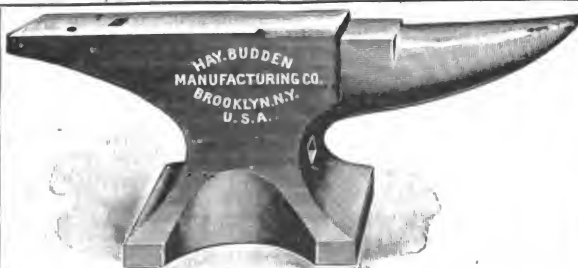
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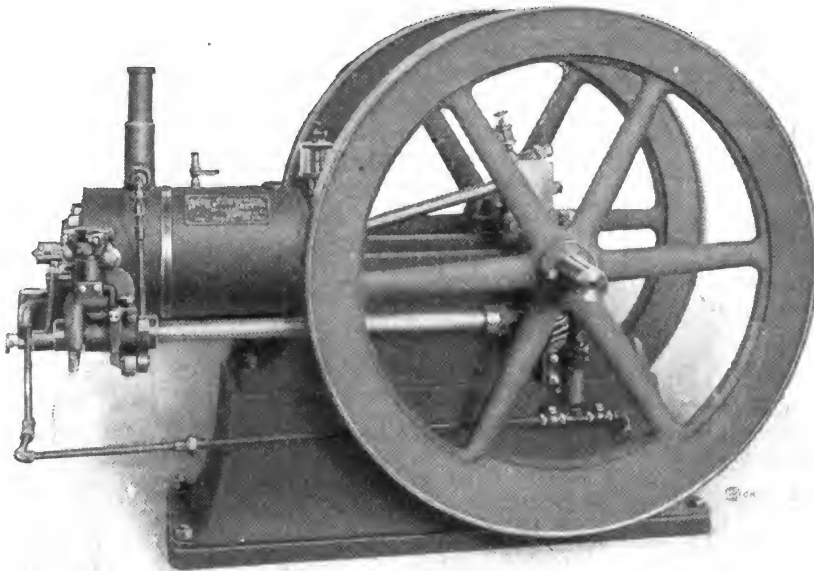
AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

JUNE, 1905

\$1.00 A YEAR
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Fig. 900, 12 inches.

Fig. 900, "Elite," Silver Blower (*patent applied for*) is distinctive in design, has cut gearing and removable, interchangeable bronze bearings for gear pinions. The gearing is self contained and attached to side of fan case, has an outer bearing plate over it and is thus permanently secured so that there is no unnecessary friction or lost power. The gear covering is removable without disturbing the gearing or paddle spider. There is a light tuyere for clay lining and a heavy one to use without lining. All parts are interchangeable.

Fig. 822, Band Saws are made in sizes 20 and 26 inch for foot or belt power and 32 and 36 inch for belt power. They are properly constructed, nicely finished, adapted to factory and repair work of every kind and give unusual satisfaction.

Fig. 718, Spoke Tenon Machine cuts tenons $\frac{7}{8}$ to 2 inches diameter up to 6 inches long and also bores the felloe.

Fig. 709, Taper Hub Boxing Machine is made as illustrated, on legs and also without legs to mount on bench. It bores tapering holes in the hubs for the boxes and cuts the recesses for nuts and collars.

Made also for hand and power.

Also Forges, and a complete line of Hand and Power Drills.

Manufactured by

— THE —
SILVER MFG. CO.,

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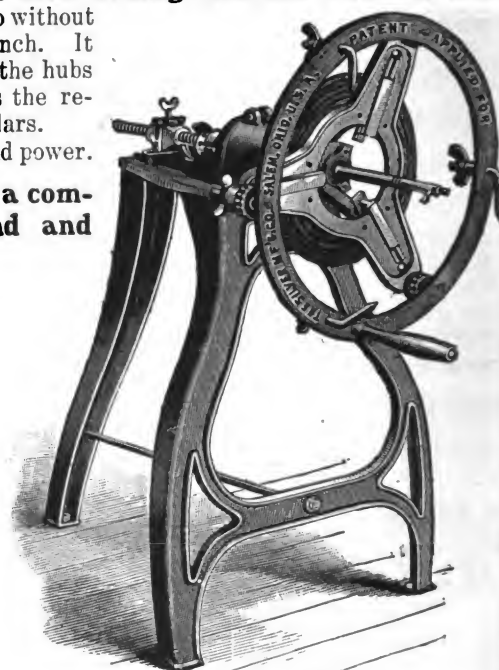


Fig. 709.

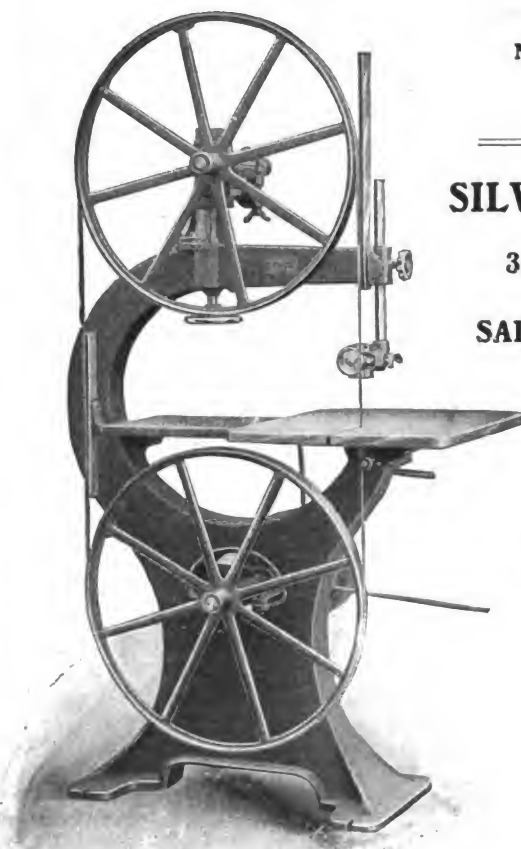


Fig. 822, 32 inch.

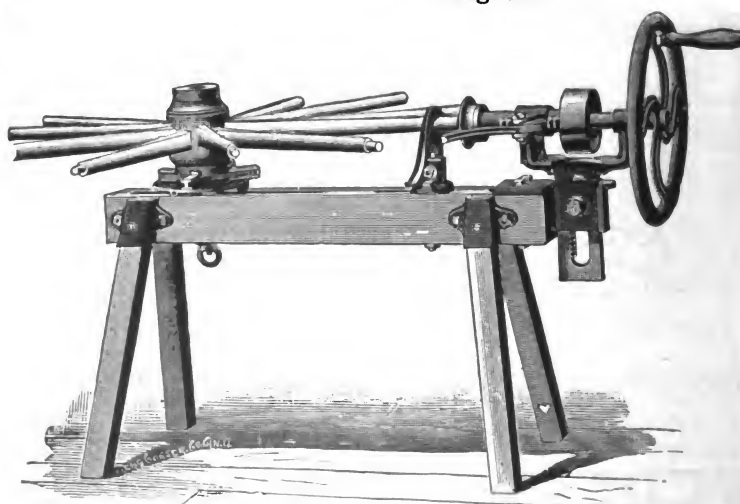


Fig. 718.

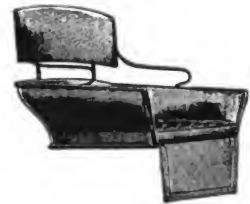
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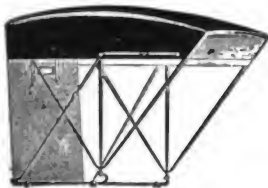
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Let us send you this most complete catalogue today. Let us send you samples of our Tops and Trimmings.



No. 6 TOP

A card will bring them both. Do it now, while you think of it.

SPECIAL NOTICE

The prizes in our GREAT PRIZE CONTEST have been awarded as follows:

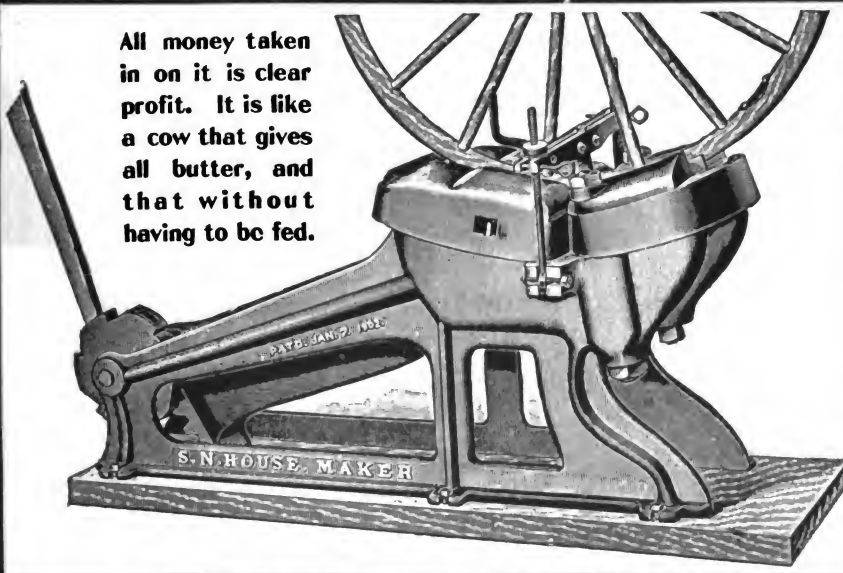
A. Schell & Son, 1st Prize: \$800.00 Automobile.
John Johns, 2nd Prize: \$125.00 2 1/4 h. p. Weber Gas Engine.
Stephenson & Nelson, 3rd Prize: \$50.00 Cash.
C. Meister, 4th Prize: \$25.00 Cash.
H. Hess & Son, 5th Prize: \$15.00 Cash.
Chavaller Bros., 6th Prize: 125 lb. "Cray Bros." Anvil, valued at \$11.25.
Ed. Henderson, 7th Prize: No. 2 Stoddards' Tire Upsetter, valued at \$8.75.
J. J. Eberle, 8th Prize: "New Advance" Drill, valued at \$7.25.
Schmidt & Schuster, 9th Prize: Reynolds' Tire Bolting Machine, valued at \$8.
Chas. Stamm, 10th Prize: Set "Irwin" Auger Bits, valued at \$3.50.

The addresses of the above parties will be cheerfully furnished upon request.

**Address, TRIMMING DEPARTMENT,
CRAY BROTHERS, CLEVELAND, O.**

THE HOUSE COLD TIRE SETTER

All money taken in on it is clear profit. It is like a cow that gives all butter, and that without having to be fed.



Has proven to be a success, and the proof of it is in the fact that we have now 1400 in use in this country, and they are in use in every state in the Union, and in seven foreign countries. And that they have been put out on trial, and that they have all been gladly accepted and paid for. The reason for our wonderful success is in the fact that they do everything we claim for them, and that they don't get out of fix, and they can't be broken, and consequently never need any repairs, and that they are so simple that a child can operate them, and that they do the work in comparatively no time, and require no new material, therefore all the money taken in on tire setting is like a present to its owner. There have been so called cold tire setters shoved on the markets that were frauds, and if you will write to us we will show you the difference between theirs and ours.

Phillipsburg, Pa., Jan. 9, 1905.

S. N. HOUSE.

Dear Sir:—I have used the No. 2 Cold Tire Setter which I bought of you, on tires from three-fourth to three inches with perfect satisfaction. I consider it the best investment I ever made, both as a time and labor-saving tool. There is practically no wear out to it, and is so simple that any boy can do better work with it than any mechanic can possibly do with a hot shrinker. I do not consider any shop complete without one of your machines.

Respectfully yours,
D. A. SOWERS.

Marine, Ill., Jan. 25, 1905.

S. N. HOUSE.

Dear Sir:—Your Tire Setter is the only practical machine on the market. I have farmers come to my shop with the remark: "I want a Cold Set on this wheel." The House Cold Tire Setter is king when it comes to setting tires. It operates direct on the tire; it does not crush the wheel, and another advantage over other Cold Setters, while shrinking the tire you can get to it with the hammer to drive up the joints, and make a solid wheel. I have one of these machines and I will not do without it as long as I continue blacksmithing.

Yours respectfully,

F. W. STUCKWISCH.

HOUSE COLD TIRE SETTER CO., Cor. Third and Clark Avenues, St. Louis, Mo.

CAPEWELL HORSE NAILS

ON THE RACE TRACK

THE TESTIMONY OF A CELEBRATED HORSESHOER ON THE GRAND CIRCUIT

Billings Park,
Memphis, Tenn., Feb. 26, 1904.

THE CAPEWELL HORSE NAIL CO.,
Hartford, Conn.

Gentlemen--

While I consider the Capewell Nail the only safe nail to use, I can especially recommend them where pads are used, (rubber, felt or leather). They never break, and I can safely say, during all of last season I did not have a shoe lost or thrown off.

For artistic finish, easy and accurate driving, and absolute safety in every respect, the Capewell Horse Nails are in a class by themselves.

Yours very cordially,

JAMES CLARK.

Made by **The Capewell Horse Nail Company**
HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World

BRANCHES

New York: 103 Beekman St.
Philadelphia: 323 Arch St.
Baltimore: 326 North Gay St.
Buffalo: 11 Ellicott St.
Cincinnati: 720 Main St.
Detroit: 29-31 Farrar St.
Mexico City: Cinco de Mayo, 76.

Chicago: 238-240 Randolph St.
St. Louis: 12-14 North 12th St.
New Orleans: 736 Union St.
Denver: 1530 16th St.
San Francisco: 636 Mission St.
Portland: 554 Worcester Block.
Toronto, Can.: 73 Adelaide St. East.

1905 Calendar and Complete Catalogue Free on Application.

EVERY SMITH would do well to have in his library copies of these books.

Forge Practice . . . 1.50
Text Book on Horseshoeing . . . 2.00
American Steel Worker . . . 2.50

We can supply them. Do you want to know more about them? Address

American Blacksmith Co., Buffalo, N. Y.

(A Lady can hold him.)

THE BEERY BIT

FOUR BITS IN ONE

Cures Kickers, Shyers, Bolt-ers, Pullers and Runaways.

There are four distinct ways of using it. They sell at eight. Agents make big money selling them. One agent writes: "I am leaving the farm to devote my entire time to the sale of the bit." Send postal for terms to agents.

Prof. W. Beery, Pleasant Hill, Ohio.

A great many Blacksmiths are selling the bit just by showing them to their regular customers at their shops.

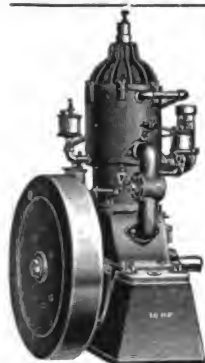


WE BUILD

Power Punches,
Lever Punches,
Lever Shears and
Bolt Cutters.

We equip shops and factories with Power, Gasoline or Steam Engines. We make all kinds of dies and special tools for the trade. Write for free booklet. Address,

WALKER TOOL CO., 205 Lee St.
Lansing, Mich.



Kerosene Oil Engines

MARINE, STATIONARY, PORTABLE

NO DANGER.

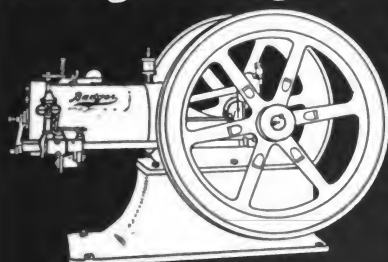
Maximum power, Lightest Weight, Simple, reliable, economical. No Batteries. Self-ignition by compression. Fully Guaranteed.

Write for Catalog.

International Power
Vehicle Company,

296 South Street, Stamford, Conn.

Badger Engines



"The world's standard for efficiency"

Every up-to-date Blacksmith should own a "Badger" Engine. The name "Badger" on an engine stands for excellence, and is a guarantee of perfect satisfaction.

It means the use of best material in construction by highest skilled labor, perfect adjustment of all parts, and the embodiment of latest practical improvements (not fads)—all backed by a long experience in building gasoline engines exclusively. Does this mean anything to you? We think it should.

"Badger" Engines are built in all styles for all purposes—Stationary, Portable or Tractor—from 2 to 30 horse power.

Our handsome illustrated 48 page catalog is FREE for the asking—Write for it to-day.

O. P. & J. LAUSON

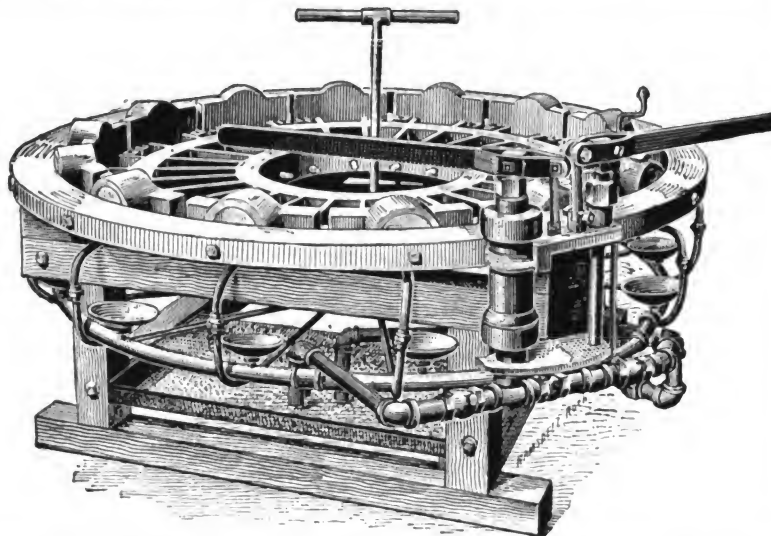
Office 103 West Water St., Milwaukee, Wis.

BLACKSMITHS:—Get the agency for uncovered territory.

Q 1

THE VALUE OF A TESTIMONIAL

Depends upon the character of the individual or firm giving same and the circumstances under which it is given. Our testimonials are from well known business men, and were given gratuitously. This is worth remembering



ELMIRA, N. Y., March 24, 1904.

THE WEST TIRE SETTER CO., Rochester, N. Y.

Dear Sirs:

I am well pleased with Hydraulic Junior Cold Tire Setter which I purchased of you. I use it every day and it gives perfect satisfaction. It will not repair an old wheel, as many expect a machine ought to do, **but it will** set tires cold and set them right.

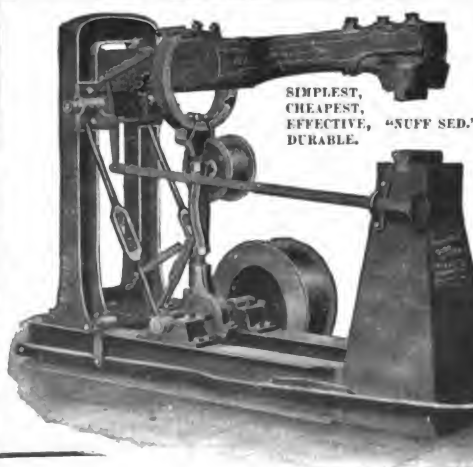
It is a great time saver and a money getter for any one who has one of your machines.

Very respectfully,
MILES TROUD.

For Prices and Terms Address

The West Tire Setter Company,

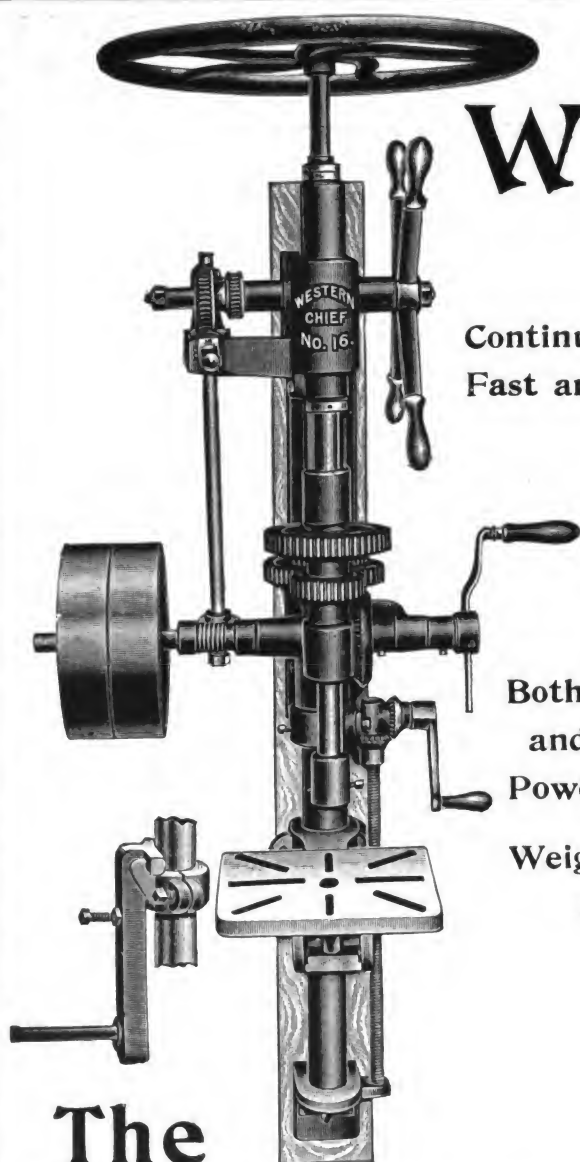
ROCHESTER, N. Y.



Hathorn's Hard-hitting Helve Hammer.

Ask your dealer or write to

HATHORN
FOUNDRY &
MACHINE
CO.
GRINNELL,
IOWA.



No. 16 Western Chief DRILL

Continuous Screw Feed.

Hand Lever Feed.

Fast and Slow Speed.

All Gears are Cut.

Raise and Lower to Table.

Drills to center of 24-inch circle.

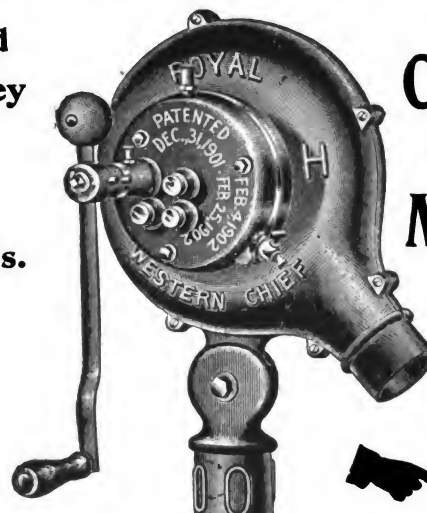
Bores 0 to 1½ in.

Spindle runs up and down 8½ inches.

Table runs up and down 16½ inches.

Both Hand
and Pulley
Power.

Weighs
360 lbs.



MADE BY
**CANEDY-
OTTO
MFG.CO.**

CHICAGO
HEIGHTS
ILL.

The Royal Blower

is absolutely free from all spiral or worm gears, and has not a ball bearing in it. Spiral and worm gears are short lived, and ball bearings are not suited to such high speeds. Phosphor bronze is used for the lead gear and bearings; and steel for the pinions and shafts. It is the simplest, lightest running and surest worker of any Blower on this day's market.

FAN, 12 inches diameter.
FIRE POT, 9x11½ x 4, inside.



➔ Royal and
Western Chief
Forges, Blowers
and Drills are
sold by every
First-class Dealer
in the World.

**Ask For
Them.**



PROFITS



An Opportunity for Blacksmiths MAKE MONEY EASILY—LITTLE CAPITAL REQUIRED

Cast Iron Breaks, Mend it with Brazit

Thousands of dollars are lost daily because of broken castings. The expense of replacing these broken parts is immense. Broken machines are idle, waiting for new parts and much money is lost by the delay. You can prevent this by mending the broken machine with BRAZIT.

Brazit Will Do It

It will successfully braze cast iron, or braze cast iron to wrought iron, or steel to cast iron, and all joints will be as strong as before they were broken. You can successfully mend broken parts of machinery, agricultural implements, tools of all descriptions, gears, engines, automobile parts, pulleys, stoves, sewing machines, lawn mowers, printing presses, pumps, and anything made of cast iron.

Any Blacksmith

can do this work without buying special equipment, as the work can be done in your forge or with a brazing torch. Hundreds of smiths are using "Brazit" regularly and find it a profitable side line. Why not take it up? It pays others and will pay you.

Read These Testimonials:

SHARON, S. C.
I received the trial set of "Brazit," and can say it beats anything I ever saw. It does just as claimed. I broke a piece of cast iron and put it together and it was stronger than before.
C. P. LOWRENCE.

NEW BEDFORD, MASS.
I have mended a number of pieces of cast iron machinery with "Brazit," which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.
WILLARD N. LANE.

WESTFIELD, MASS.
We acknowledge the receipt of your sample of "Brazit," which we have tried and found satisfactory.
POPE MANUFACTURING CO.

SOUTH DARTMOUTH, MASS.
I have used your compound and it worked O. K. Wish I had had some of it before.
THOREDOR BRIGHTMAN.

SPECIAL OFFER To American Blacksmith Readers:

We will send prepaid a complete sample working set for . . . **\$1.00** This set is sufficient to braze a large number of pieces. The directions are simple and complete.

Regular Working Sets—A complete outfit with plain directions, \$5.00

A trial of **Brazit** is the best way we know of for proving to you it will do as claimed. **We want you to try it.** You can do a big and profitable business mending all the broken castings in your neighborhood.



U. S. Brazing Compound Company

INCORPORATED

113-115 So. Second St.

NEW BEDFORD, MASS.



NO MATTER HOW BADLY THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.

LOOK
AT
THIS

Columbus Anvil and Forging Co.

West Frankfort St.,
Columbus, Ohio.

THEN
AT
THIS

WE ARE
EXPERTS AT
REPAIRING OLD
WROUGHT
ANVILS.

WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

ASK YOUR DEALER FOR THEM.

HONEST DEALINGS

Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interest will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

HIGH GRADE Carriage and Wagon SPRINGS

TROY SPRING WORKS
TROY, N. Y.



"QUICK ACTION"

IGNITING DYNAMOS
Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

The
Knoblock-
Heideman
Mfg. Co.,
SOUTH BEND,
IND.

Locations for Industries

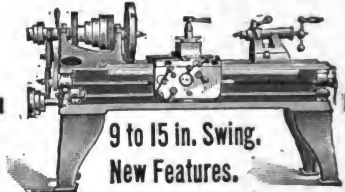
Erie Railroad System
New York to Chicago

The Erie Railroad System's Industrial Department has all the territory traversed by the railroad districted in relation to resources; markets and advantages for manufacturing, and can advise with manufacturers of specific products as to suitable locations, furnishing them with current information of a comprehensive nature, dealing with the project in its full relation to manufacture and commerce.

Address

LUIS JACKSON

Industrial Commissioner, Erie Railroad Company
21 Cortlandt Street, New York.



9 to 15 in. Swing.
New Features.

SEBASTIAN LATHES are Good Lathes
Catalogue Free. Sizes 9, 10, 13, 15 inches.

Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each Lathe. Foot Lathes, Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert Street, CINCINNATI, OHIO.

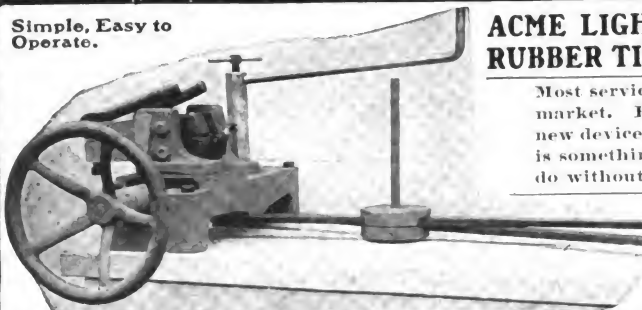


THE
KITTERMAN
INVENTION CO.

81 W. Washington St.
CHICAGO, ILL.

Manufactures all kinds of
Rubber Pads and Taped
Shoes and Screw Calks at
prices to defy com-
petition. Get our big
Circular and know
the rest.

Simple, Easy to
Operate.



ACME LIGHTNING RUBBER TIRING MACHINES

Most serviceable machine on the market. Fully guaranteed. Our new device for drawing up rubber is something you cannot afford to do without.

Write for descriptive
Circulars and Prices.

W. S. BROOKS MANUF. CO., 32-34 Summit St. AKRON, OHIO.

No. 112 DRILLS

Fitting Silver & Deming's and Prentice Blacksmiths' Drill
Presses Nos. 1 and 2, Short Lengths.

Style No. 1



Style No. 2



Shanks $\frac{1}{2}$ inch diameter, $2\frac{1}{2}$ inches long. Style No. 2 always furnished unless otherwise ordered.

Morse Twist Drill and Machine Company

NEW BEDFORD, MASS.
U. S. A.

Makers of
Twist Drills, Reamers,
Chucks, Cutters, Taps,
Machines,
Dies, Machinists' Tools.

TOOLS

FOR THE
HORSESHOER
AND

BLACKSMITH
IS OUR SPECIALTY



New Rounding Hammer.

FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

Champion Tool Co.

Meadville, Pa.

Mr. Blacksmith, the U. S. GOVERNMENT Has Recognized Merit
and Stamped Its Approval on the

BROOKS COLD TIRE SETTER

By placing same in the Government shops. So do hundreds of smiths all over the country commend the

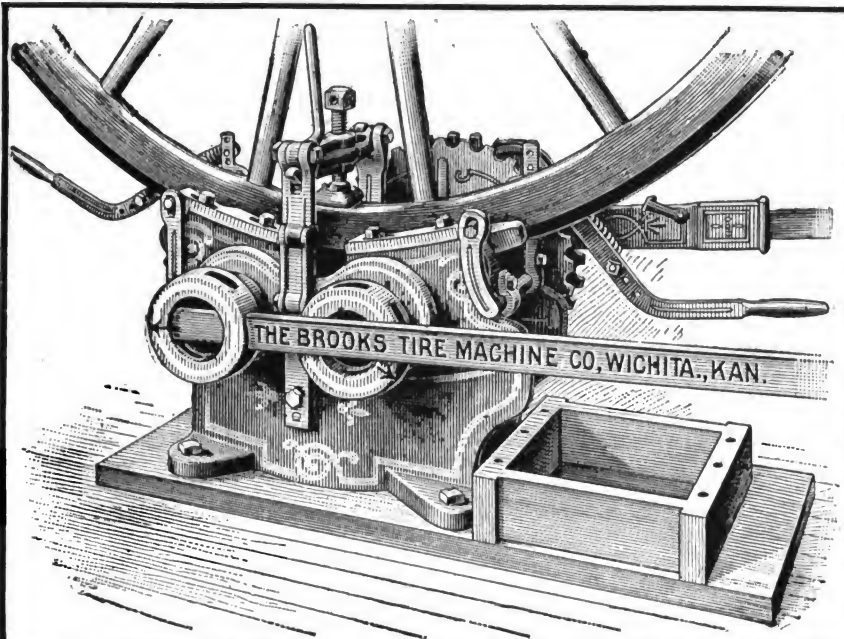
BROOKS

in the highest terms as the greatest money making machine in their shops.

Don't throw money away on experimental tire setters. Get the results of twelve years' experience.

THE BROOKS WAS PERFECTED BY LONG EXPERIENCE. IT SETS A TIRE QUICKLY AND PERFECTLY. NO KINKING OF TIRES. AUTOMATIC GRIP KEYS. Every machine warranted.

One price to all and we extend to you very liberal terms. Write today.



THE BROOKS TIRE MACHINE CO.

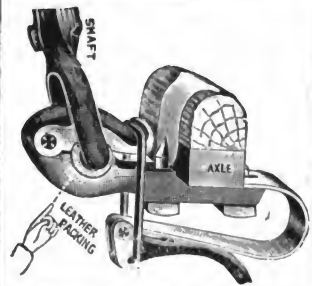
121 NORTH WATER STREET, WICHITA, KANSAS

SEE THE LEATHER PACKING

(PATENTED)

The
leather
packing in

the *Bradley Shaft Coupling* does the business—stops the rattle—lessens the friction and wear—and lengthens the life of the Coupling. In the *Bradley* only the leather packing wears, and the Coupling will perform the service for which it was intended as long as the carriage itself

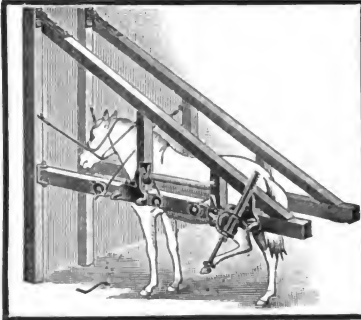


THE **BRADLEY**
SHAFT COUPLING

C. C.
BRADLEY
& SON

SYRACUSE, N. Y.

BARCUS HORSE STOCKS

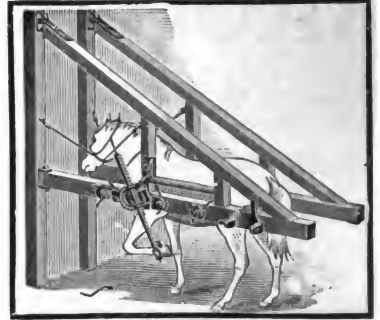


ARE SIMPLE...
RELIABLE...
AND DURABLE

Have no block and tackle with ropes to get tangled and broken. No bracing to roof or floor. Will not skin or chafe the foot. All the objectionable features of the cheap stock have been eliminated. NOT THE CHEAPEST, BUT THE BEST. WRITE FOR PARTICULARS.

GEO. BARCUS & COMPANY,
Box 61. WABASH, IND., U. S. A.

CANADIAN HORSE STOCK COMPANY—Hamilton, Ontario, Canada



YOUR CHOICE

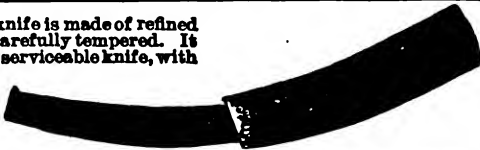
is here given you of five neat premiums in return for one new subscription to **THE AMERICAN BLACKSMITH**. Tell your brother smith how well you like the paper, send us his dollar, and get your choice of the premiums, free and sent postpaid.

WHICH ONE DO YOU WANT?

Remit by money order, stamps or registered letter. If you are *not already* a subscriber, send \$1.00 for a year's subscription and a premium.

American Blacksmith Co.—Box 974—Buffalo, N. Y.

1. This hoof knife is made of refined crucible steel, carefully tempered. It is a high-grade, serviceable knife, with Heller Bros.' reputation back of it. Cut shows it about quarter size.



2. We offer as a premium a two line rubber stamp, with your name and address on it, accompanied with an inking pad, making a complete outfit. You will find use for it every day.



3. A handsome and reliable little pocket level like this would be of constant use to you. Nicely finished, 8½ inches long.



4. This Monkey-wrench in spite of being the size shown above, works just like a big wrench. The handle is of bone and the metal parts nickel-plated.



5. This miniature blacksmith hammer is neatly finished, and makes a splendid watch charm. Cut shows it full size.



When ordering ANYTHING
in the line of

STEEL SHAPES

for repairing plows, cultivators and other implements, be sure to ask for "STAR" goods and get the best. : : : All qualities and sizes, and everything guaranteed.

STAR MANUFACTURING CO.

Carpentersville, Ill.



SPAVINOFF CURES

Spavin, Ringbone, Grease Heel, Sweeney, Windgall, Enlargement, Curb, Galls, Sores, Pollevis, Scratches, Shoe Bolls, &c. Removes unnatural growths and lameness, leaving flesh smooth and clean. Testimonials.

CHURCH BROS., APTON, N. Y.

\$1.00 per Box, by Mail. For HORSES AND CATTLE.

METAL SHINGLE ROOFING...



With Montross Telescope Side-Locks is the best roofing in the world for house or barn. Storm proof. Easily applied. Catalogue, Prices and Testimonials free for the asking.

Montross Metal Shingle Co., CAMDEN, N. J.

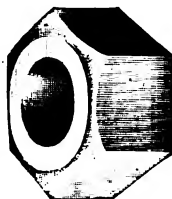


STEEL STAMPS

Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, etc.

Geo. M. Ness, Jr.,
61 Fulton St., N. Y.

Price list sent upon application.



Remember

"MILTON"

The price will
interest you.

MILTON MANUFACTURING CO., MILTON, PENNA.

**COLD
PUNCHED**

NUTS

Give satisfaction always.

No. 1.



A Personal Letter From Morgan & Wright



To American Blacksmith Readers.

You know and we know that there is good money in fitting hoof pads.

More money, perhaps, than in doing almost any other kind of work around your shop, considering the time spent and the amount of capital invested.

A big pad business would mean big profits--and profits are the things most men are in business to get.

One of the most important things to be thought of in the building up of this business is to see to it that your customer is furnished a pad of such quality and durability as will make him a permanent buyer of pads.

(There can be no surer way of "knocking the bottom out" of this business than by giving the horseowner cheap, unsatisfactory pads.)

You must convince him not only that he ought to use pads, but that he ought to use your pads--put on in your way.

Morgan & Wright pads have won a host of friends among horseshoers who are building up a big pad business in just this way.

The fact that they are fitted more easily and run larger than other brands, makes them extra good profit-bringers.

In addition to this, they give tip-top satisfaction to the horseowner (and his horse), and thus do their part in building up the business.

We want that you will specify them in your next order if for no other reason than to give them a fair test. WILL YOU DO IT ?

Yours for a big pad business,

MORGAN & WRIGHT.

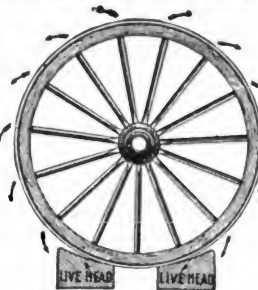
Booklet on "Modern Horseshoeing" sent Free to those who mention the American Blacksmith.

MAYERS COLD TIRE SETTER

GUARANTEED. PERFECT WORK WARRANTED.

Drawing Tire both sides at same time insures uniform dish.

Five minutes to set a tire and do it perfectly.



Note the Arrows.
They show the
"ways."

WHICH
APPEALS TO
MECHANICAL
JUDGMENT

?

Which will please
your customers
BEST ?



"All Others" have one dead or
stationary head, and the one
live head must draw tire all
around the wheel.

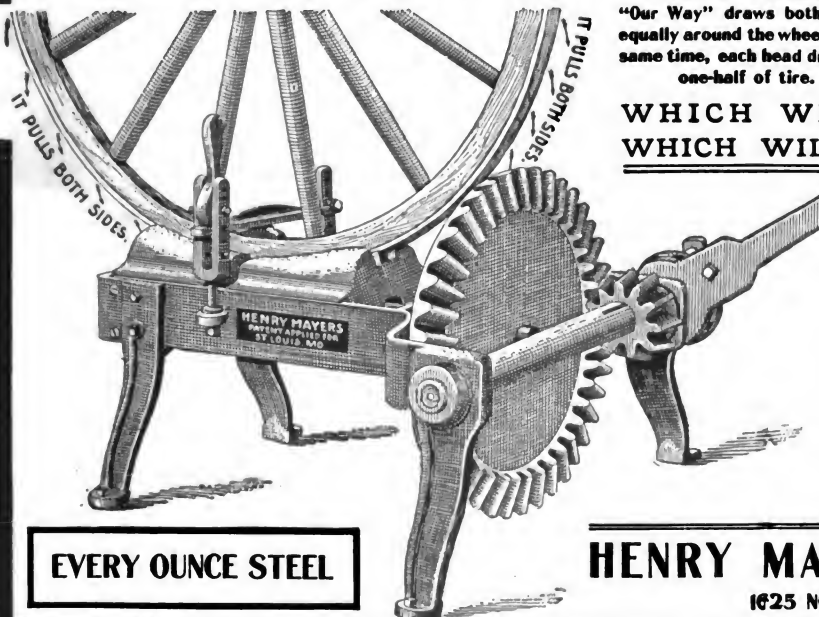
"Our Way" draws both sides
equally around the wheel at the
same time, each head drawing
one-half of tire.

WHICH WILL DO THE BEST WORK?
WHICH WILL TIGHTEN LOOSE SPOKES ?

Two heads in slotted frame, brought together by right and left handed threads (2 to inch) on 3/8 inch shaft, best steel, in counter sunk nuts (4 inches each). Reversible 1 1/4 pitch, 2 1/2 face, small wheel 5 inches, large wheel 22 inches. No lost motion. No keys or wedges to take up slack or "to get new hold." Heads can be 4 inches apart or any less space as desired. Grip keys set and release themselves instantly. No driving up or hammering loose, and are so made that they cannot wear the felloe nor kink the tire. Easy terms. Every part fully warranted. Write to-day for full description, price, etc.

SIZES

Height of wheel, 24 in.
Height of frame, 15 in.
Height of Legs, 10 in.
Width of frame, 12 in.
Total Length, 36 in.
Weight, 650 lbs. and
every ounce steel.



EVERY OUNCE STEEL

HENRY MAYERS MACHINERY CO.

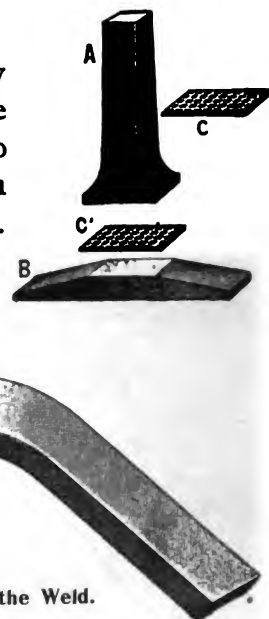
1625 NORTH 7TH STREET, ST. LOUIS, MO.

"LAFFITTE" (PATENT) WELDING PLATES

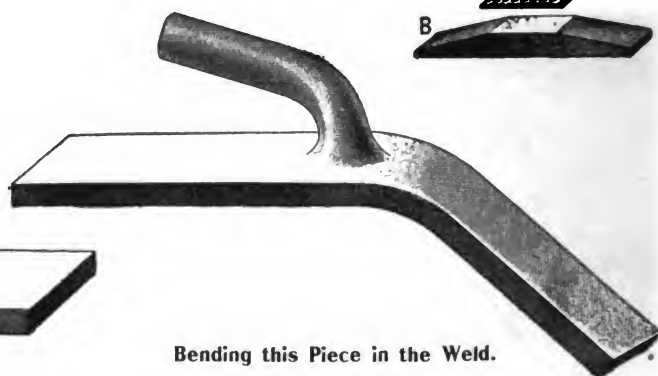
Chemically Welding Iron and Steel at a Low Temperature

Gives an entirely homogeneous joint capable of resisting all ordinary strains, and saves at least 33 per cent. in time and fuel.

Directions.—No departure in method is required. Simply withdraw the pieces from the fire at a good heat, place a piece of the welding plate between the parts to be welded, press lightly until the plate begins to fuse, then hammer lightly to make it adhere, and finish by forging in the usual way. This is partially illustrated in the cuts shown here.



Welding a Round Iron Bar to Steel.



Bending this Piece in the Weld.

By the use of these plates, iron upon iron, iron upon steel and steel upon steel can be welded with the utmost ease.

Any blacksmith can use them and their value only ends with his ingenuity

NET PRICES
Heavy Plates, \$12.50 per 100, f. o. b. Philadelphia
Light Plates, \$10.00 per 100, f. o. b. Philadelphia

If your dealer does not carry them, send us a money order for \$1.00 and we will send postpaid, six (6) full sized plates sufficient to make 50 to 100 welds (depending on the work) and to give them a thorough trial.

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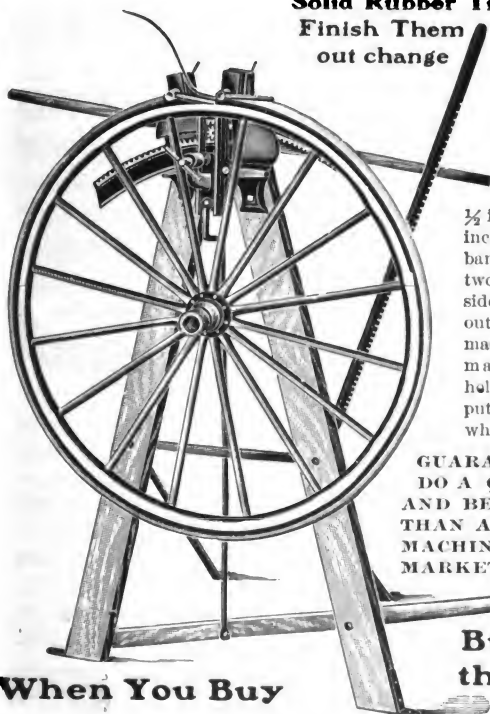
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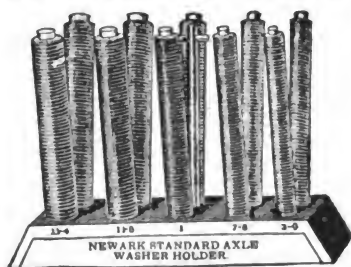
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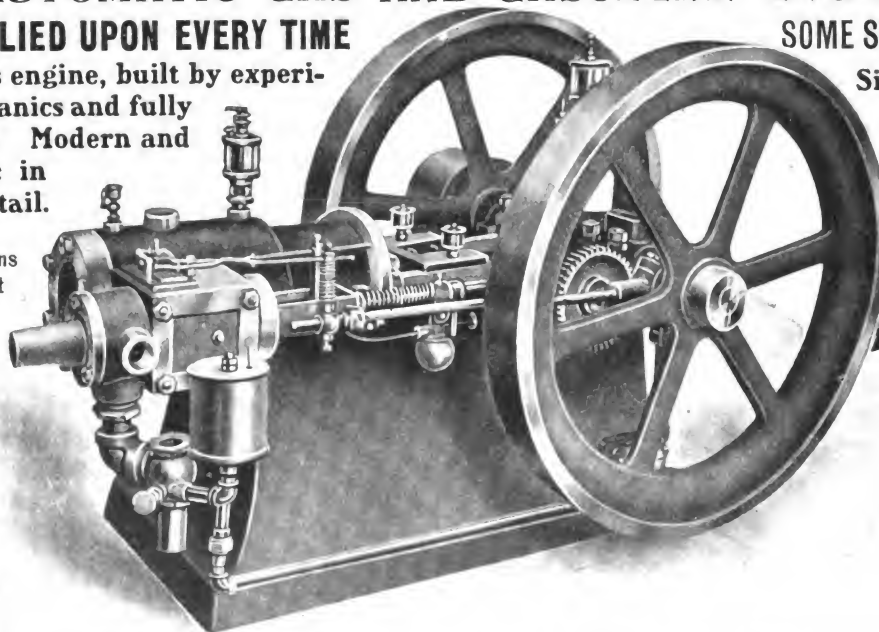
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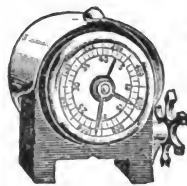
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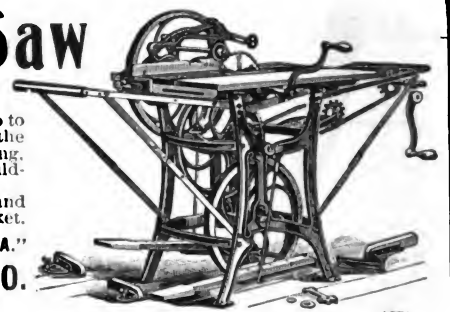
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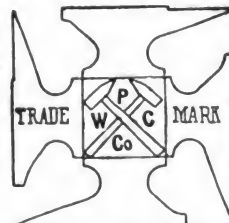
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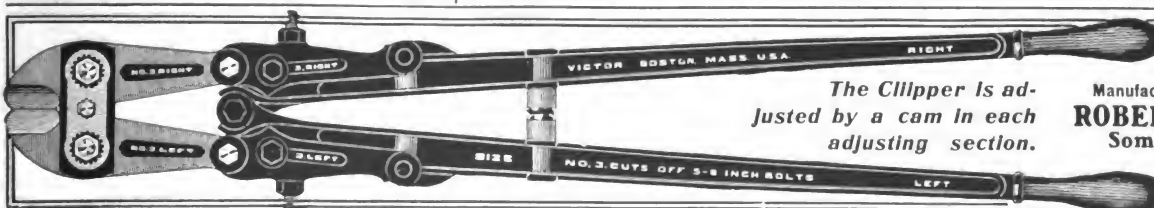
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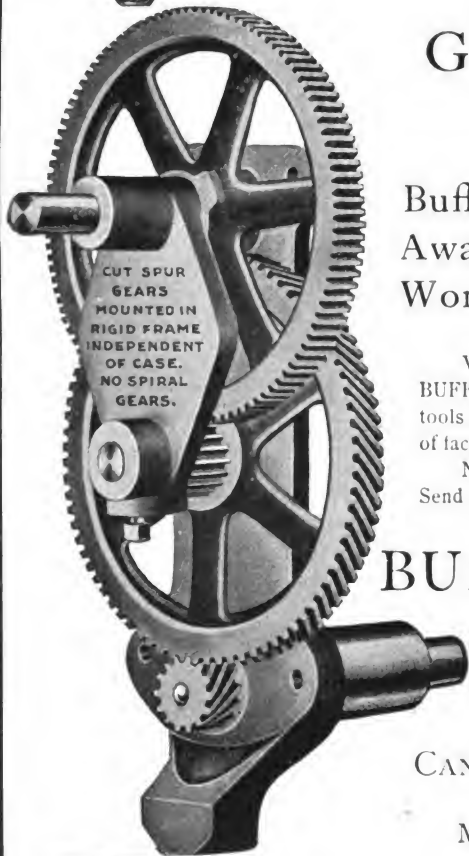
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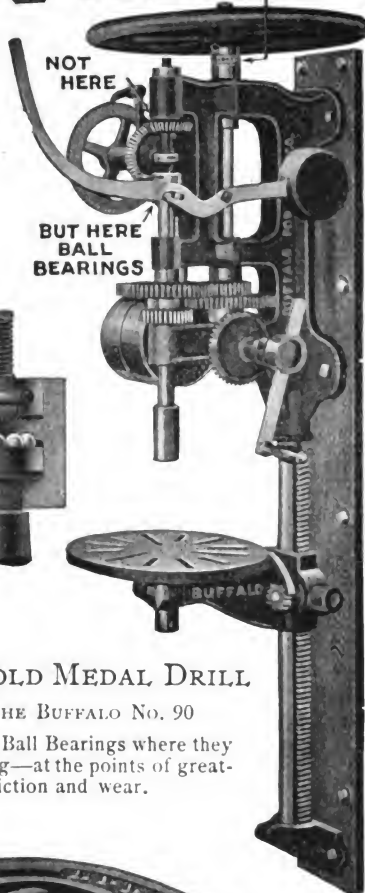


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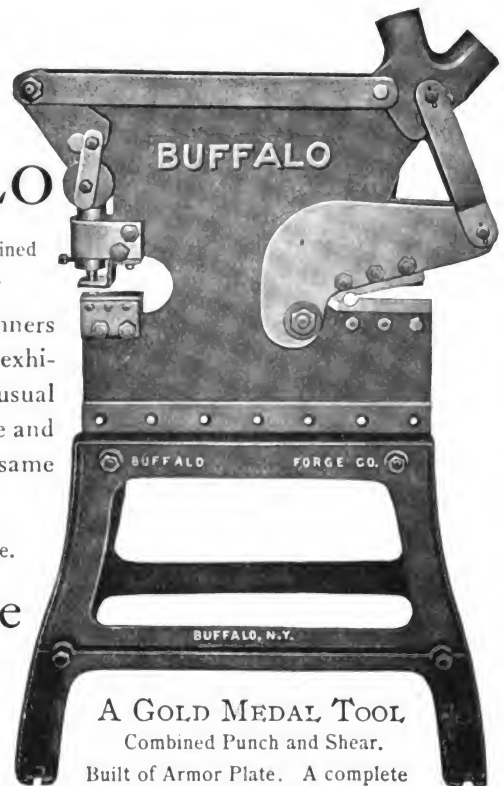
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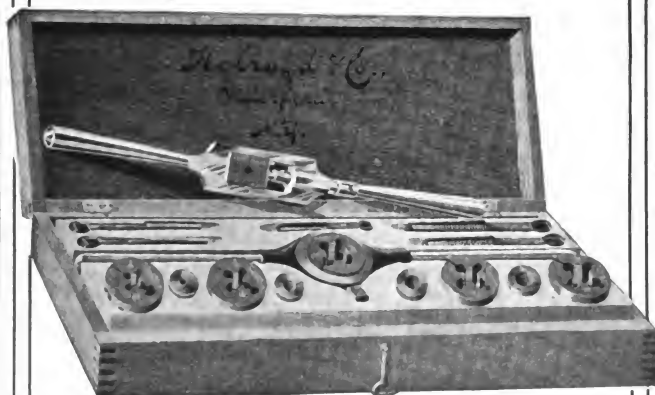
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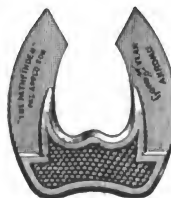
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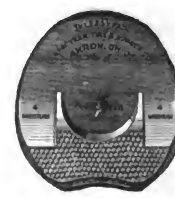
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A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

JUNE, 1905

NUMBER 9

BUFFALO, N. Y., U. S. A.

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Energy and Work.

The theory known to science as the conservation of energy is a most interesting one. It tells us, for instance, that energy, which is defined as the capacity for doing work, can neither be created nor destroyed, but only changed from one form to another. Heat, sound, light, electricity and mechanical work, for instance, are all various forms of energy. The theory mentioned above is accepted as universal in its application and gives the lie to all claimants of perpetual motion devices. Since energy cannot be created, it is impossible to contrive any machine which will give out more than is put into it, and hence we may put it down as impossible for any machine to run forever, or to bring about a gain in energy. Inventors are continuously coming forward with such devices, more or less ingenious and complicated, and on the strength of the wonderful claims made the public has often parted with its money for worthless stock in a company intended to promote the idea, but no matter how sincere the inventor, or how apparently plausible the working of the machine, the theory of the conservation of energy stands as an absolute bar to success for

its claims. The more extravagant the claims, the more wary should the prospective investors be.

Not long since marvelous claims were made for liquid air, how it was destined to become the universal force for power purposes, and what not. Liquid air was to be produced at no cost in a machine which was to run itself and to do other work besides. A careful investigation, undeceived by the fact that a new thing was being dealt with, would have shown these claims unprovable. We now very rarely hear of liquid air.

Any machine or process which claims to create energy or to deliver more work than is put into it can be set down as an impossibility on the face of it. In fact the very reverse would be the case owing to the frictional losses and the imperfection of the machines.

It is interesting to note the application of the law of conservation of energy to men and animals. One often thinks of himself as being able to create energy and go on pounding the anvil without consuming energy in turn. The more work a man or animal does, the more he must eat, as it is the food which forms the fuel and does the work. By the chemical processes of the body the food is burned, its energy appearing as muscular work, and this energy of the muscles at the anvil is in turn transformed into sound, heat and work.

Profits in Side-lines.

During the present administration, when our country seems to be enjoying abundant prosperity, we hear many stories of growth and progress, several of which lead us to believe that the fault lies not in our stars, but in ourselves, if we do not succeed. In the industrial world, there is generally room for the active, ambitious man, willing to put honest effort into his daily work, and we feel bound to comment here upon the success of several of our blacksmith friends—success, won by perseverance.

No better example of the progres-

siveness of the American craftsman could be referred to than the career of Mr. Alexander Cameron, of South Dakota, an account of which appeared on page 155 of our May issue. We call the attention of our readers to this article, trusting that it will act as an incentive, especially to the younger members of the craft and inspire them to similar action. A good example is always worthy of being followed, and the career of Mr. Cameron shows what an active smith can accomplish by taking up a profitable side-line in connection with his regular shop work.

Just after the spring rush, usually a rather dull season sets in, and this together with the arrival of the early summer months is conducive to some laziness on the part of the average smith. It is but natural, and business being slack, there seems little else to do but gossip and sit around the shop with the boys, telling worthless tales. But how much more advantageous it would be to spend this time in building up a substantial trade on some product which you have decided to handle in just such dull seasons. And there are hundreds of side-lines from which the smith can choose. Some find it profitable to carry a line of horse remedies, and several of our readers have been known to make many a dollar in this way. Country smiths find it to their advantage to act as agents for farm implement manufacturers, selling farming machinery to their customers on commission. One of our Illinois subscribers tells us that he has thirty colonies of bees to look after and we are led to believe that every man can find a line that will pay him. Of course, a smith should choose one suited to his locality, and in every case must study the requirements of his patrons before trying to satisfy them.

THE AMERICAN BLACKSMITH has always advised its readers to make good use of spare time. Side-lines are good things. They enable the progressive smith to occupy his leisure moments profitably, and it is gratifying to know

that so many realize this fact. We are always glad to hear of such stories of success as referred to in the beginning of this article, for they bring with them a measure of satisfaction in knowing that our friends have followed our teachings to good advantage.

The Iron and Steel Industry of Japan.

The late war in the East has had many far-reaching effects upon the industrial world. Japan has realized the necessity of developing her resources along many lines, and with due justice to the land of the Mikado, it must be said that the progressive little island has been alive to almost every one of its opportunities.

At the present time, the progress which the Japanese are making in the production of iron and steel is attracting considerable attention. A short time ago, the Japanese government decided to encourage the growth of this industry, and erected a plant of enormous size at an excellent harbor in the northwestern corner of the island of Kyushu, which is located in one of the richest coal districts in the country. The situation is a most favorable one for this line, the plant being but ten miles from the noted port of Moji, and is directly connected with the large railroads. Moreover, it is conveniently located for the importation of raw material from China, and this is no mean consideration, when it is understood that

the Japs can work the ore into manufactured articles, and even then sell cheaper than their Chinese neighbors. The works were planned on a most elaborate scale and included pig iron and steel departments, and rolling mills. No expense was spared in the equipment. The specifications called for modern appliances in every instance, and nothing but machinery of the latest invention was to be used.

time, the establishment of the works had not been rushed to any extent, as the authorities preferred to take their time and do things right. But when war was declared, the officials were anxious to see the plant in good working order, realizing that at such times they could hardly rely upon imports from abroad, and that it would be a great advantage to manufacture their own firearms and other war materials. Accordingly, special efforts were made to get the works in running order, instructions being that the plant should be completed with a view of furnishing the necessities of the Japanese army and navy. In this way, it may be said that the immediate progress of iron and steel manufacture in Japan is directly due to the present war in the East.

During the progress of the war, every effort was made to advance the interests of this important industry. Many difficulties were encountered at first, but gradually the smelting furnaces were operated successfully, producing some one hundred and fifty tons daily, and every day arrangements are being made to increase the output. Just one year ago a steel smelting

furnace was started and six months later it turned out about 3,000 tons of steel of excellent quality. This is a remarkable showing, when we consider the little experience the Japs have had in this line. Of course, the manufacture of iron and steel in Japan is still in an undeveloped



A BEAUTIFUL EXAMPLE OF WROUGHT IRON WORK IN THE CITY HALL AT BERLIN.

In fact, the government endeavored to establish a plant, complete and up-to-date in every detail. "Nothing too good for the Jap," seemed to be the scheme of this huge enterprise.

At the opening of the war, these plans were not yet completed. Up to that

time, the establishment of the works had not been rushed to any extent, as the authorities preferred to take their time and do things right. But when war was declared, the officials were anxious to see the plant in good working order, realizing that at such times they could hardly rely upon imports from abroad, and that it would be a great advantage to manufacture their own firearms and other war materials.

Of course, the manufacture of iron and steel in Japan is still in an undeveloped

state, but this is only the beginning of what promises to grow into an industry of paramount importance in that country, for the Japs have recently demonstrated that when they do a thing, they believe in doing it well. It is interesting to watch the recent rapid strides of the iron and steel industry not only in the Orient, but in our own country as well, for the present year has already seen astonishing progress in this very important line, in America.

The Main Doorway of the City Hall at Berlin.

The imposing piece of wrought iron work illustrated this month is the main doorway of the city hall at Berlin, Germany. The work is from the forge of

thorns are entwined. The flames on the doorway are symbolic of purity. The flames coming from the torch on each side of the doors signify truth and the same motif is conveyed on the doors and the center pillar, from which the loose brush wood is fired in the door arch. At each side of the middle pillar is a dog with a crown about its neck. They are joined by a lock and chain. In the middle pillar is a group symbolic of the fall of Adam and Eve. This is not told in words, but is so apparent as to make explanation superfluous. The style of the tree is Indian and signifies support and protection.

Space does not permit of an enumeration of all the designs and symbols

without smoke. This consummation so intently wished for has been attained by the installation of the Buffalo Down Draft Forge System, installed by the Buffalo Forge Company. The shop is 95 feet by 28 feet, with steel frame monitor roof entirely filled with glass and all ventilation operated from the floor, giving a light that is perfect. The extreme height is thirty feet. The walls are lined with white enameled brick, which is easily kept clean and adds much to the light and general appearance of the shop. The floor is of concrete, with upsetting blocks set in level with the floor line.

The lecture room is 28 feet by 16 feet, seating thirty-five pupils, with ample



THE FORGE ROOM AT THE RICHARD T. CRANE MANUAL TRAINING SCHOOL.

Armbruster Brothers of Frankfort. This artistic example of the smithing art is of a most grand and imposing nature. Its plan is symbolic, and from the dogs at the bottom to the female figure at the top it is entirely in keeping with the rest of the building in which it stands. The doorway is artistic in every detail and each figure and ornament is patent, but not carried to excess. The forms and figures are all natural and each separate symbol bears a relation to the whole. Arbitrary designs have no place in the make up of this masterpiece. The doorway taken as a whole has an extraordinary meaning and is dignified to a high degree. The doors or gates come together in a dove-tailed manner and their motif is such that it is entirely lost when they are open. Their surface is of iron band braided work in which

contained in this masterwork, but the foregoing are sufficient to illustrate the high quality, the extreme care, the attention to detail, the skill, discernment and patience embodied in this magnificent example of the smithing art. When one considers that the doorway is patterned entirely after the design of a single person, one marvels at the wonders wrought by the master minds of the century.

The Richard T. Crane Manual Training School.

If I mistake not, it was Solomon who said "There is nothing new under the sun." I think if he could pay a visit to the forge shop of the Richard T. Crane Manual Training School of Chicago, he would be apt to change his mind, for here he could find a modern miracle; nothing less than a blacksmith shop

blackboard space and shelving hung in such a manner as not to interfere with the floor space. The store room contains racks for iron and steel with shelving and pigeonholes for exercises and tools. The anvil blocks are all cast iron, designed and made in the school. They are fastened with an anchor bolt bedded into the concrete. This is considered a decided improvement over the old wooden block.

The shop equipment and accessories consist of thirty-two Buffalo Down Draft Forges of a pattern designed especially for manual training schools. Each forge contains six sheet steel drawers which run on roller bearings. The drawers have cast iron fronts with brass numbers, locks and keys, so that each pupil has his own drawer to which no one has access but himself. For the

heavier class of work, a coke furnace, gas furnace, a Bement & Miles steam hammer, a shears, grinder, drill press, etc., are furnished. The above machines are all driven by independent motors. On the floor can be found surface plates, swedge blocks, cones and vise benches, with a full assortment of bench tools, such as taps, dies, punches, files, etc. Each forge is provided with a full set of tools, swedges and fullers from $\frac{3}{8}$ of an inch to $1\frac{1}{2}$ inches, hot and cold chisels, punches, tongs, hardie, $1\frac{1}{2}$ -

exercise before the class. This usually consists of drawing a point without turning it into a paint brush. From this on the exercises are given out progressively, becoming more difficult as the pupil advances. Twenty exercises of the usual character given in all schools, including drawing down, upsetting, twisting, bending, forming and punching.

The lessons are presented to the pupils on the blackboard or by blue prints, from which the pupil is not only expected to make something that looks something like the drawing, but the dimensions must also be correct. So far the young man has had no welding, and right here is where his trouble begins. "It looks easy, but I cannot make them stick" is a very familiar expression about this time.

The pupil is now given a lecture on welding, the instructor illustrating on the blackboard the five principle methods or scarfs usually employed, the lap weld, the split weld (or in the common parlance of the shop, male and female), the butt weld, jump weld and the V weld. After the pupil has successfully accomplished the above in iron, he is called upon to weld steel to iron and then steel to steel. Much emphasis is placed on the above lessons in welding, as the instructors in this school consider it of vital importance for, in the event of the pupil taking up a college course, he will fail to get credit for his blacksmithing if he is unable to make a perfect weld. Another feature which is rigidly insisted upon is working to dimensions.

The pupil has now arrived at a period where the hand hammer and sledge have to give way to their more weighty competitor, the steam hammer, under which he is taught to make his tongs and blacksmith tools, crank shafts and miscellaneous small forgings, principally engine and machine. A case hardening lecture here takes up their attention. Before taking up the work on steel, another lecture is given on Bessemer, open hearth, blister, shear, crucible, cast and alloy steels; heat treatment, forging, annealing, hardening and tempering in water, oil, mercury and color and

thermometer tempering. He is now taught how to make hand hammers, cold chisels, lathe tools, etc. By the time the above are completed, the more advanced pupil has about twenty days left. All pupils having completed the above exercises to the satisfaction of their instructors, are allowed the privilege of making any object within the limits of their ability, such as andirons, piano lamp stands, table lamps, umbrella stands, jardiniere stands, etc. Some prefer to make small crank shafts, connection rods, valve yokes, rocker arms, etc. By this time some of the more ambitious young men would even tackle a locomotive or rudder frame for a battleship. That they may be able to carry the same confidence through the battle of life is the best wish of their instructors.

The supervision of this extensive department of forging is under two men of large and varied experience in practical engineering life who, I should say, are both masters of their profession, although neither of them can claim the distinction of being able to shoe a horse.

Does the Carriage Paint Shop Pay? *

BY E. S.

Several years ago I read articles in the carriage trade papers, entitled, "Does the carriage paint shop pay?" and reading up on the same subject so often, I concluded that my paint shop was not paying and of course longed for an opportunity to investigate the matter thoroughly.

In the year 1903 I kept tab of all the material bought, wages paid and then the money taken in. Without considering any rent, taxes, insurance, water, fuel and bad accounts, the expenditures amounted to \$618 more than the receipts. It costs me \$2,100 a year to run my shop. That is, running expenses, not including wages or material bought. As we have three departments, paint, wood and blacksmith, one-third of this expense belonging to paint shop, we were running our paint shop at a loss of \$1,300; an amount that was startling, and so much more than I had anticipated.

We paint about 150 jobs a year, have from three to six painters, according to the time of year, and charge for color and two coats of varnish on buggy, \$8.00; on surry, \$12.00; for painting a buggy, \$14.00, and for painting a surry,

*EDITOR'S NOTE: What do other craftsmen, running paint departments, think of this question? We gladly open our columns to arguments pro and con. If the painting department cannot be made to pay, we want to know it.



SOME OF THE FORGINGS DONE AT THE RICHARD T. CRANE MANUAL TRAINING SCHOOL.

pound hand hammer, sledge, square and calipers. All tools are stamped with the same number as the forge, making each pupil accountable for his own tools.

The work is conducted somewhat along the following lines: First the class is made familiar with the shop equipment, the use of the forge and tools, operating the steam hammer, how to grind their tools and how to build and maintain a fire, with a talk on fuels, coal, coke, gas and oil. This constitutes the first lesson, with a short lecture on the nature and properties of wrought iron. After the pupil has built his fire, the instructor demonstrates the first

\$20.00. I think one reason we lost so much was that we did too much for the money received. That is, a customer would want color and varnish when rims were bare and needed it and other parts leaded. The painters being desirous of pleasing the customers, would give the job what it needed and more than was paid for.

In the year 1904 we did not throw in these extras, and charged for everything; 25 cents for washing vehicles. If we took the paint off we charged from one to three dollars for that. At the end of the year receipts were \$68.00 more than the expenditures, but not

carrying light loads up to 50 pounds without overloading it.

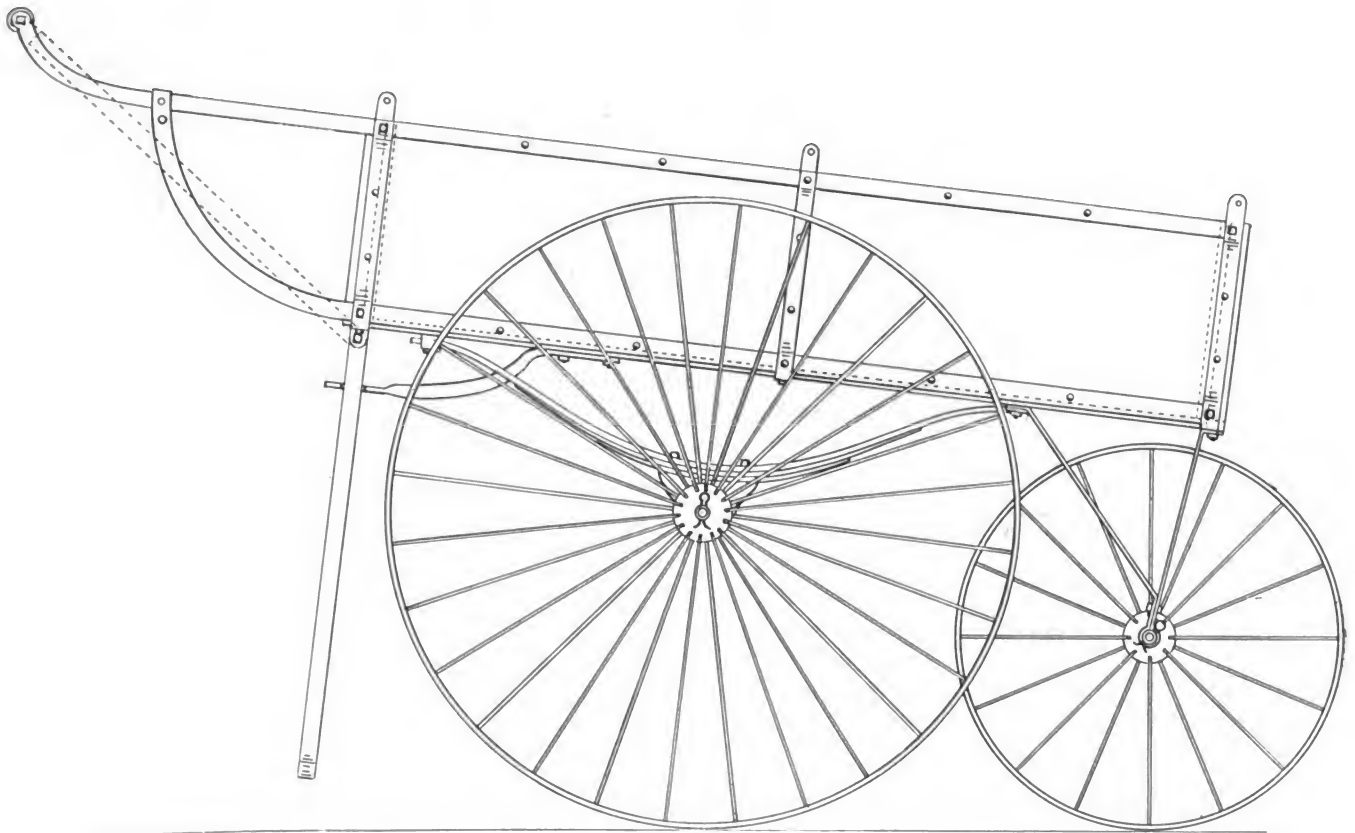
The Construction of the Body.

The length of the body is 42 inches. The width is 22 inches, and the depth is 10 inches. The body is made of three planed ash boards, $\frac{1}{2}$ inch thick, $7\frac{3}{4}$ inches wide, and 42 inches long. Make two joints. After joined, the three boards should be 22 inches wide. The two side boards are 42 inches long, $9\frac{1}{2}$ inches wide, and $\frac{1}{2}$ inch thick. The two end boards are $21\frac{3}{4}$ inches long, $9\frac{1}{2}$ inches wide, and also $\frac{1}{2}$ inch thick. The end boards are notched, $\frac{3}{8}$ of an inch, into the side boards, $\frac{1}{4}$ of an inch

them. Put in the two end boards and the body is done as far as the wood work is concerned.

Ironing and Strengthening the Body.

Most all such carts are poorly ironed, but if this is well done, the carts will last a great deal longer. The pieces which are screwed on top of the bottom boards next to the side boards perform two duties, one is to hold the side and end boards in position, the other to strengthen the body and increase its carrying capacity. At the ends there are two pieces, one inside, the other outside. This will make a groove $\frac{3}{4}$ of an inch deep for the end boards to rest



A SIDE VIEW OF THE COMMERCIAL PUSH CART.

counting bad accounts and running expenses, so we were still running at a loss of over \$600. For 1905 we are drawing the line still closer and will see if we can't make a still better showing.

A prominent carriage repair man of a neighboring town told me last fall that during their busy season they would refuse carriage painting unless it brought other work with it.

I believe if other paint shops would investigate this question, they would find that money made in other departments is squandered in the paint shop.

Working Draft of a Commercial Push Cart.

With these four views we will explain how simple, how light, and yet how strong a push cart can be made for

from the ends of the boards. Make two pieces of ash, $\frac{3}{8}$ by $\frac{1}{4}$ of an inch, and 21 inches long, and screw them on the top surface of the bottom boards, level with both ends. See that the screws do not interfere with the bolts on the bottom. The end panels are screwed against those end pieces from the inside, four screws being used for each panel. There are two ash pieces $\frac{3}{8}$ by $1\frac{1}{2}$ inches by $39\frac{1}{4}$ inches long, fitted between the end boards. These two pieces are placed $\frac{1}{2}$ of an inch from the bottom board edges, so that when the side boards rest against them the pieces must be level on the outside. These $\frac{3}{8}$ by $1\frac{1}{2}$ -inch pieces are screwed to the bottom boards with six screws for each and the side boards screwed against

in. To strengthen the body, iron strips $\frac{3}{16}$ by $\frac{1}{4}$ of an inch are screwed on the top and bottom edge of side and end boards. The bottom ones, one on each side, run straight from the front to the rear end of the body, and turn up in a circular direction to the upper strip, lapping over on both sides. To do this another piece $\frac{3}{16}$ by $\frac{1}{4}$ of an inch is bent to fit against both irons and riveted as shown on side, front and rear views. The upper strip is bent as shown in side view, and both are connected with the wood handle. There is also a strip on the inside. The inside and outside strips are riveted together. The double strips on side and end boards are of the most importance, as in most cases in loading or unloading the corners of side

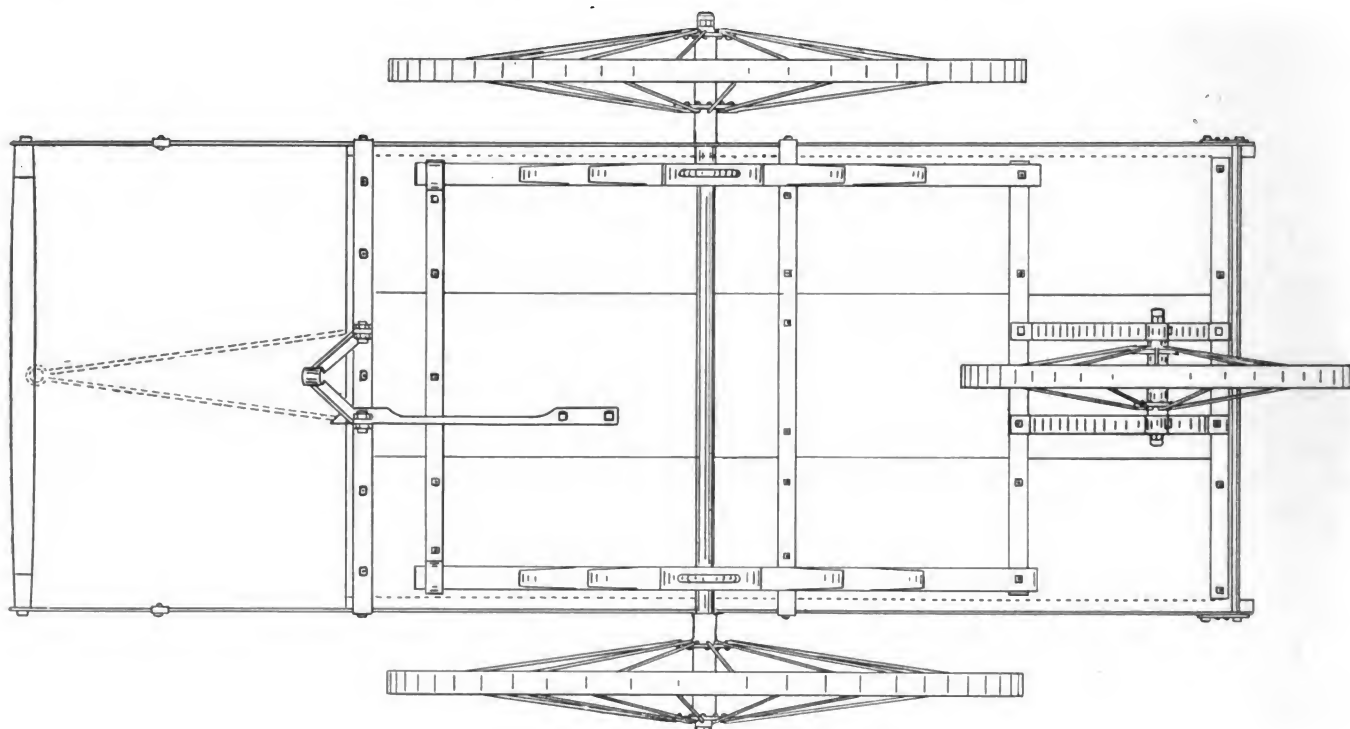
and end boards are injured. Besides the above, there are three more strips, one at each end and one at the center. These three strips are alike. They start $1\frac{1}{2}$ inches above the top edge of the body with holes at the ends. These holes are for the cords on the cover which is used in rainy weather. The vertical strips must be bent over the lengthwise strips at both top and bottom. They go across the bottom, and turn up again on the other side and are entirely in one piece. At the ends the strips are bolted through the bottom boards and also the $\frac{5}{8}$ -inch strips. It will be seen how this strengthens the ends and sides. To keep the body from spreading, there are two rods $\frac{3}{8}$ of an inch in diameter resting between the bottom boards, and

and work in a socket. The springs are bolted to the axle with a strap-bolt, which is bent around a special casting. Each casting is made in two parts, the joint being at the center of the axle and the strap-bolt passing around and holding the two parts.

There is a stay which is used when the cart is at rest, and loaded heavier back than front. When empty the cart will tip forward on the small wheel. The stay is best seen in the rear view, but when not needed it is lifted up to the handle and strapped to it as shown by dotted lines inside view. When the stay is down it is locked to the catch shown in the side and bottom views.

The diameters of the wire wheels are 18 and 30 inches. Sixteen spokes are used

anew, screwed an emery wheel to my drill and polished plow shovels and ground castings and found I needed some power. I bought a 3-horse power steam engine second hand and an emery stand. I ground and polished my plow and lister shares and when the farmers found that they could get new work all polished, I got all of the plow work in my territory and my work increased and I had to put in more machinery and a larger engine. I bought a 4-horse-power gas engine and it called for more machinery. Then I traded my 4-horse engine for a 6-horse Witte gasoline engine. The following is what I have in the line of machinery which I run with my engine: Two forges, one Little Giant trip hammer, an iron lathe, a wood



THE BOTTOM PLAN OF THE COMMERCIAL PUSH CART.

$\frac{5}{8}$ -inch pieces next to the end boards. To obtain the space for these two rods cut the bottom inside corner from the $\frac{5}{8}$ -inch pieces before they are screwed to the bottom boards. On the top of the end boards there is no rod, but pieces for a screw thread are welded to the strips at both back and front. See front and back view. This makes a neater job than a rod and is stronger. These four end braces will keep the body always in a good position, and prevent side motion, which is sure to happen when the body is getting worn from much use and overloading.

The springs are $29\frac{1}{2}$ inches long, with $4\frac{1}{2}$ -inch openings. They have three plates and are $1\frac{1}{2}$ inches wide. At the front end they are bolted to the bottom boards, but in the rear they are loose

for the 18-inch wheel, and 28 for the 30-inch wheels. The size of the spokes is $\frac{3}{16}$ of an inch. The size of the tires for all three wheels is $\frac{1}{4}$ by $1\frac{1}{8}$ inches. Length of the hubs for the large wheels is $5\frac{1}{2}$ inches and for small wheel is $3\frac{1}{2}$ inches. Size of the axle is $\frac{3}{4}$ inch.

These carts may also be fitted with wooden wheels, for which the dimensions are as follows: Hubs, $3\frac{1}{2}$ by $5\frac{1}{2}$ inches, spokes, $1\frac{1}{8}$ by $\frac{5}{8}$ of an inch, and rims $1\frac{3}{16}$ thick by $1\frac{1}{8}$ inches deep.

A Strong Argument in Favor of Power.

E. H. PORTER.

I have been working at the blacksmith trade for twenty-eight years and am forty-five years old. In 1896 everything I had, except my health, was blown away by a cyclone. I started in

lathe, an emery stand, a polishing stand, one rip saw, one 26-inch band saw, a disc sharpener, one tenoning machine, a boring machine, a grindstone, a pump, and also a Brooks cold tire machine. Now I have a new stone shop 36 by 50 feet with a self-supporting roof. I also have a Barcus Horse stock which is great for vicious horses.

My boy and I sharpened 93 shares one day last fall and went home feeling fine. I can also tenon a set of four wagon wheels in 30 minutes and bore all the felloes in 30 minutes. I can saw out two pair of tongue hounds in ten minutes, or in other words I can do with my engine and tools what four men can do by hand and don't keep my customers waiting. I can set a buggy tire in five minutes, a wagon tire in ten

minutes and can sharpen a 16-inch plow in ten minutes. I attribute my success to power and to reading the best trade journals that are printed, such as THE AMERICAN BLACKSMITH. I expect to take it as long as the fire burns in my forge.

The Painting of Old Work.

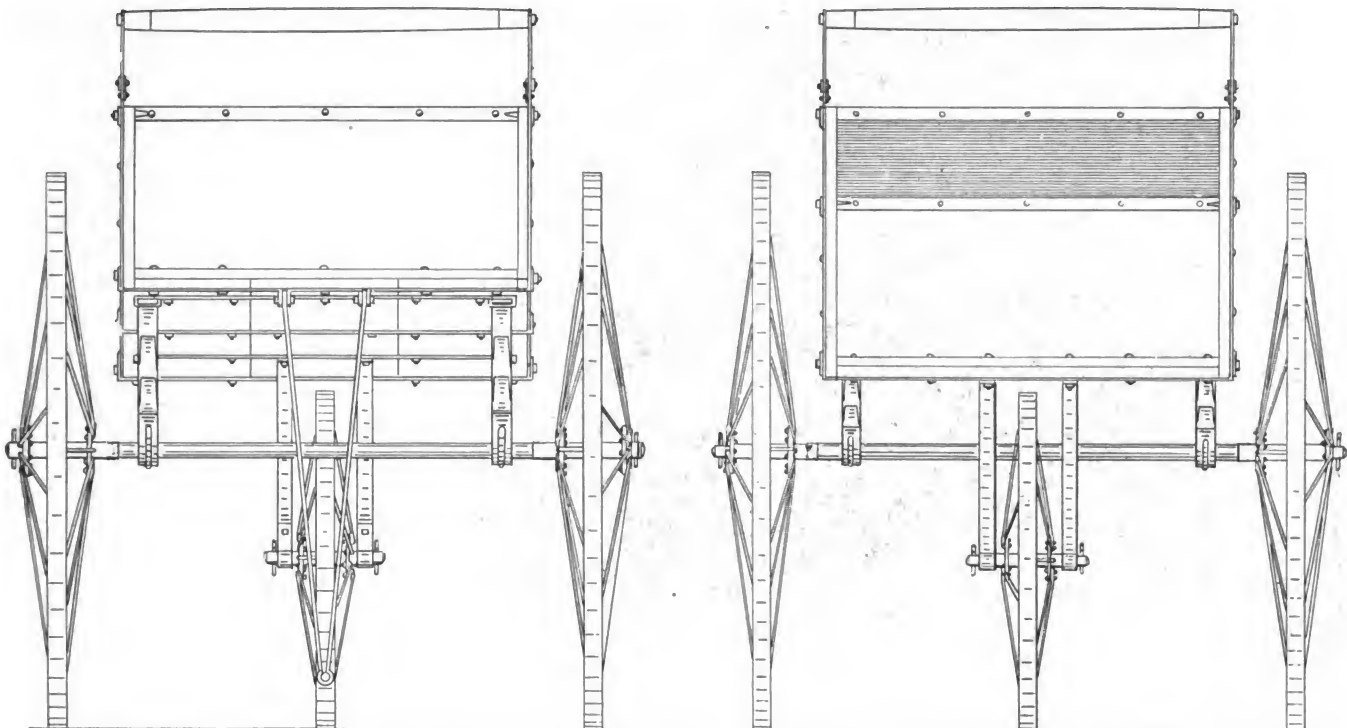
Division of Old Work Into Classes—The Several Classes Briefly Discussed—Details That Count Most in the Work—Profits to Which the Business is Entitled, Etc.

M. C. HILLICK.

The painting of old work may be divided into five classes as follows: Class A—Touch-up-and-varnish; Class B—Color, and one coat of varnish; Class C—Color, one coat of color-and-varnish, or one coat clear rubbing varnish and

Clean off axle arms and greasy accumulations. Dust out top and sponge off outside. Then clean inside of body thoroughly. With pulverized number 00 pumice stone and water rub over the outside sufficient to remove varnish gloss and surface defects; then wash body and running parts, after which match the color and touch up the surface only where touching is actually needed. Complete this work in the forenoon. Next dress the top if the owner so elects, using any good, reliable dressing for the purpose. Dress side curtains, boot, dash and shaft leathers, if these parts be worn enough to warrant it. Now add a bit of color to a heavy body, finishing varnish and varnish

figured with a crop of fine checks, or with the color so badly faded that it cannot be conveniently matched. Clean up job as in class A, and unhang vehicle to no greater extent. With number 0 sand paper, go over the body surface to take off nibs, etc., and prepare a foothold for the color. Omit sand papering running parts, but use a dash of varnish in the color to make it grip a little tighter to the surface. Then proceed to apply a coat of color to the vehicle throughout. Follow, when dry, by striping running parts. In a room with the temperature at 65° or 70°, and a perfectly dry air prevailing, this color and the striping will do to finish over in four or five



REAR VIEW OF PUSH CART.

FRONT VIEW OF PUSH CART.

finish; Class D—Resurface with rough-stuff upon the old paint foundation and finish; Class E—Burn off body, and, if necessary, running parts; build up with new foundation and finish as in case of new work. In brief, following are the details connected with the various classes of work, using a buggy for example:

Class A.

Bring job into the paint shop and do as little unhangings or dissembling of parts as possible. This all takes time and eats quickly into the profits of a cheap job. If the shop is roomy enough to allow the shafts to remain attached to running parts, and the top to the seat, so much the better. Never detach the body from the running parts. Block the vehicle up to a convenient height and remove the wheels.

inside of body and seat. Mix up some lampblack in old varnish "slops" and paint bottom of body and seat. Your customer will usually appreciate this little attention to a too often neglected feature. Then finish outside of body and seat, using a varnish suited to the grade and character of the vehicle. Next finish the wheels. Last, finish running parts. This work can be easily completed in a day. In some localities the small shop painter will be able to get \$4 for this class of a job, in others, \$5, and still others, \$6. It all depends, or, rather, very largely depends, upon the financial status of the community, and the pride of the vehicle-using public in your locality.

Class B.

This is a job showing a surface dis-

hours. Then finish, in the matter of all details, as in class A. This job commands, as a rule, at least \$1 more than the former one, some painters, the writer among the number, think that oftentimes it can be done quicker than the touch-up-and-varnish job that has faded in varying degrees and requires much work and a good deal of touching up.

Class C.

A class that has a surface cracked and checked beyond repair with a single coat of varnish. If the paint shop has room enough it can be worked through to a finish without more unhangings than in the preceding classes. If room is at a premium, which, unfortunately, is usually the case in the small shop, remove top, shafts and wheels. Sandpaper the surface thoroughly as in the

preceding class; this to include running parts. Then apply a coat of color throughout. Then apply a coat of color-and-varnish over all. Or, if preferred, apply a coat of black japan to the body, and on the running parts use color-and-varnish. After 48 hours rub the body with pulverized pumice stone and water, using a felt pad, preferably a perforated one, to rub with. For the running parts take a soft piece of sponge, and with this moistened and dipped into the number 00 pulverized pumice stone, go over the surface, rubbing the exposed sections most. Wash the entire job up clean and touch up any existing defects; then dressing the tops, etc., and varnishing inside of

number 1 or $1\frac{1}{2}$ sandpaper, the size depending upon the make of paper, number 1 paper with some manufacturing firms running as coarse as the $1\frac{1}{2}$ of other firms, and vice versa. The surface cleaned and sandpapered carefully, apply with a camel's hair brush a coat of lead mixed to dry flat, say one part raw linseed oil to three parts turpentine. Permit this coat to dry thirty-six hours at the least, and better forty-eight hours, after which putty with the regulation quick putty described in the previous paper. The day following the puttying of the job, apply a coat of roughstuff as per formula 2, also given in previous issue. Then in due time, look the surface over and re-putty any

apply one coat of color; then one coat of color and varnish, which coat may, when dry, be rubbed lightly, and the surface stripped. Then apply a coat of clear rubbing varnish. Rub this coat thoroughly with pulverized pumice stone and water, touch up necessary places, and finish with a heavy body gear finishing varnish—one that has body and brilliancy sufficient to make the color stand out rich and full.

Class E.

In actual practice this is the easiest class to handle, because the surface once stripped completely to the bare wood, with no remaining vestige of the old paint foundation, offers a surface in all respects equal to the new wood. In a majority of cases the running parts will go without burning off, but when it is necessary that such parts should be burned off, the painter should receive not less than \$3 additional, and in some localities \$4 additional should be charged. For burning off paint in the small shop, the hand lamp or torch described in a former issue of *THE AMERICAN BLACKSMITH* is an indispensable tool. A broad-bladed French scraping knife, half elastic, is the best sort of tool to lift the softened paint with. Begin at one side of the body and heat the paint for a certain width the full length of the panel, holding the lamp in the left hand and removing the soft paint with the scraping knife held in the right hand. Use due caution to avoid scorching the wood, as charred patches of wood are hard to remove, and the wood under these charred places is never quite the same as before. In burning off the paint from the running parts still greater care is necessary, and under the most skillful management scorched or blackened patches will ensue. But the hard wood of the running parts will not char deep as quickly as the soft wood of the bodies, and little stretches of surface that get black and scorchy under the flame may usually be sandpapered out quite clean. Nevertheless, the very best care and attention to the burning is needed to insure a surface, when ready for priming, that is vital and supple with strength and energy. The burning off having been completed, and the surface sandpapered thoroughly, it only remains for the painter to follow the practice of painting new work as detailed in the chapter devoted to that subject.

As to the profits due from painting old work, it depends largely upon the resourcefulness and energy of the painter and the shop facilities he is able



A CONVENIENT STYLE OF WAGON FOR PEDDLING PURPOSES.

the body and seat, go forward, finishing the body and running parts. If any striping is desired it should be done upon the completion of the rubbing process. This will afford a nice, clean finish, and will suffice to obliterate any and all minor checking and fissuring which may appear on the surface.

Class D.

This calls for quite a different method of procedure. Unhang the vehicle completely and mark all the parts plainly, entering a complete inventory of all the parts of the job in the book kept for that purpose. Sandpaper the surface with number $\frac{1}{2}$ sand paper. If any rough, shelly places exist upon the running parts, or for that matter, upon the body, scrape them down to the hard, firm surface, and sandpaper with

overlooked surface defects. Next day apply two coats of roughstuff, and the day following repeat the work. Stand aside for forty-eight hours, and then with rubbing brick and water, rub the roughstuff to a surface. Then proceed with the various operations as described in the chapter on "Painting New Work" in the May issue.

In the meantime, sandpaper the running parts, and if they are in especially poor condition, putty glaze the exposed sections. The day after, sandpaper these parts and apply a coat of "dead lead," i. e., a lead made to dry absolutely without a shimmer of gloss. In about thirty-six hours, in a good drying room, this lead will do to sand well—to sand so that the dust will fly freely with no clogging of the paper. Then

to command. Labor saving devices play quite as important a part in painting old work as in painting new—even more so, it is claimed by many. The schedule of prices covering the classes of work detailed above, using a buggy for example, and taking the territory tenanted by the small shop for a case in point, will run approximately as follows:

Class A.....	\$ 3.50 to \$ 4.50
" B.....	5.00 to 5.50
" C.....	6.50 to 7.00
" D.....	9.00 to 10.00
" E, burn off body only	11.00 to 12.00
" E, burn off body and gear.....	14.00 to 15.00

Upon this basis, with cost of labor and material in hand, the reader can easily compute the profits he should derive from painting old work.

A Convenient Style of Wagon for Peddling Purposes.

J. W. O'CONNER.

The accompanying engraving shows a very convenient style of wagon for a vegetable peddler or huckster. It was built for a man who recently came from California. He said the wagon makers there could not build one like it.

Partial specifications of the vehicle are as follows: 1½-inch Concord axles, front spring 2 by 7; back springs 2 by 6 and a 5-inch fifth wheel. The top is made with sun shades as shown. It will also be seen that the wagon is fitted with side and rear curtains to protect its contents in rainy weather. There are many wagons built on this style in this city and vicinity and they are found to be very convenient for the purpose for which they are intended.

The Plan of a Well-Equipped Shop of North Carolina.

The accompanying engraving is the plan of the lower floor of the Aurora Mfg. Company's shop. The upper floor is used as a paint shop. Part one in the engraving represents the blacksmith department. A is a bench with a vise; B, a forge; C, a bench with two vises and a bolt rack; D, a cold tire setter; E, a tire bending machine; F, a power hammer; G, a power forge; H, a punch and shears; J, an emery wheel; K, a drill press. Number two is the wood working department; L is a surface planer; M, a spoke-tennoning machine; N, a hub boring machine; O, a band saw; P, a wood lathe; R, a rip and cut-off saw; S, a power pump; T, a 10-horsepower gasoline engine. Number three is the wheel bench department; U, shelves for light material; V, a bench for wheel work; W, a bench for putty work; X, is the office. The paint department occupies the second story, which is built over the wheel bench and

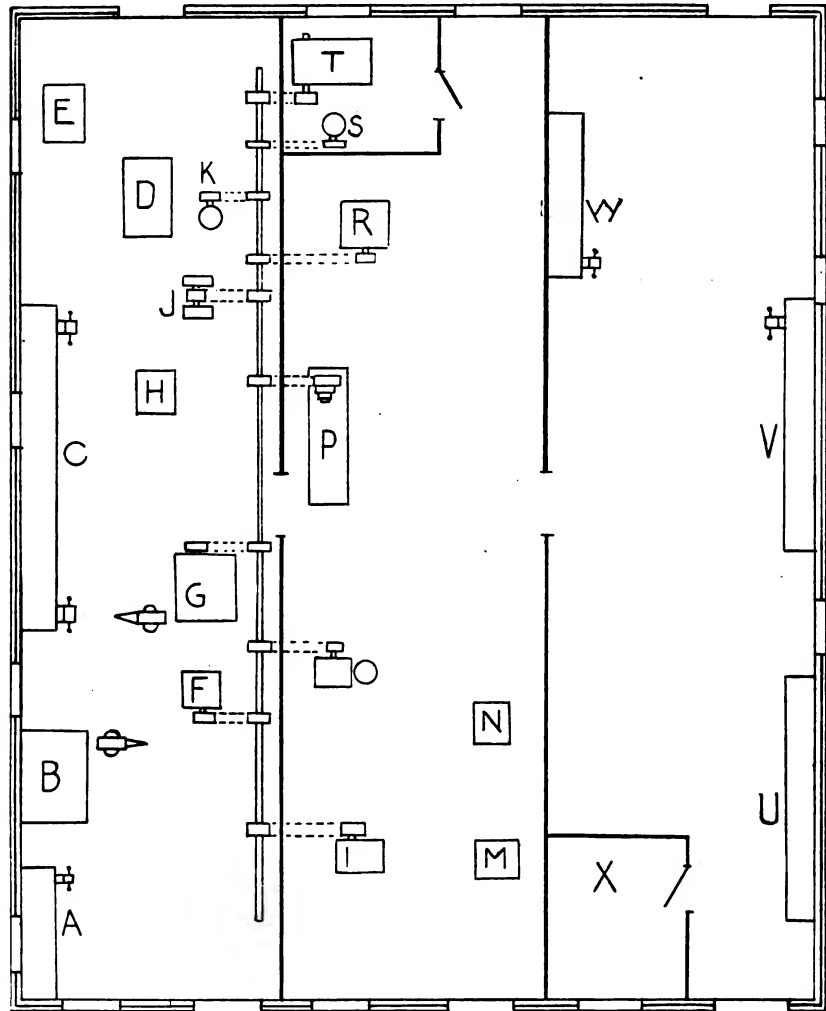
wood-working departments. A shed built along the front of the shop also serves as a wash rack for the paint shop.

A Short Talk on Practical Carriage Making.

NELS PETERSEN.

Carriage making, generally speaking, is a craft combining a number of trades, the principle ones being those of the wood worker, the blacksmith, the painter and the trimmer. If one man could become proficient in all of them, it would be an easy matter for him to

for the brain of some one able to give to the workmen a clear idea of what he is expected to make, as it is necessary to have some knowledge of the details in each of the different trades combined in carriage making. To attempt to convey one's idea wholly by verbal statements would of course be unsatisfactory in every way and even a written statement, in most cases is insufficient for the mechanic to go by. A working drawing is the best method for explaining the details of the various parts and



THE PLAN OF A WELL-EQUIPPED SHOP OF NORTH CAROLINA.

construct any kind of carriage according to his own ideas. But it would be a rather tedious undertaking for one man to do and as much better headway can be made by employing men who are skilled in their particular trade, no one building vehicles for profit would think of employing any other system. But carriage building is in some respects like any other industry, there is a constant demand for something new and different from what the other fellow has, and each year sees something new and original in styles and designs, color of painting, trimming, etc. This furnishes employment

is the surest way to prevent mistakes and avoid disputes between workman and boss. With a plan before him, no further explanation is necessary, provided the mechanic knows his business. It also facilitates the work, in that it enables one to get the correct idea as to shape, dimensions and general construction, and does away with the hit and miss methods so prevalent in most shops. A blackboard is very convenient for draftings, as measures can be more readily gotten from a draft made full size than when drawn to a scale and mistakes are not so liable to occur if this method is employed.

On Horseback.

E. PAXTON HOOD.

Hurrah! for a ride in the morning gray,
On the back of a bounding steed.
What a pleasure to list how the wild winds
play;
Hark! Hark! to their music—away! away!
Gallop away with speed.
'Neath the leaf and the cloud in spring-
time's pride
There is health in a morning's joyous ride.

And hurrah! for a ride in sultry noon,
When the summer has mounted high,
'Neath the shady wood in the glowing June,
When the rivulet chanteth its lullaby tune
To the breeze as it wanders by,
Quietly down by the brooklet's side;—
Sweet is the summer's joyous ride.

And do you not love at evening's hour,
By the light of the sinking sun,
To wend your way o'er the widening moor,
Where the silvery mists their mystery pour,
While the stars come one by one?
Over the heath by the mountain's side,
Pensive and sweet is the evening's ride.

I tell thee, O stranger, that unto me
The plunge of a fiery steed
Is a noble thought,—to the brave and free
It is music, and breath, and majesty,—
'Tis the life of a noble deed;
And the heart and the mind are in spirit
allied

In the charm of a morning's glorious ride.

Then hurrah! for the ring of the bridle
rein,—

Away, brave horse, away!
The preacher or poet may chant their
strain,
The bookman, his wine of the past may
drain—

We bide not with them today;
And yet it is true, we may look with pride,
On the mental spoils of a morning's ride.



June.

Hot, dry weather.

Loose tires and gears.

Better not to be than to be without a
purpose.

Busy tools and a growing salary go hand
in hand.

Get knowledge but don't forget the
courage to use it.

How do you repair Sarven wheels now?
Cut the rivets?

Deal squarely with yourself by dealing
squarely with others.

The Japanese Government has purchased
forty automobiles for war use.

To err is human, but we should keep our
errors as far apart as possible.

Circumferentor—a useful little machine
with a big name. Usually called a tire
wheel.

Like the belt on a loose pulley, some men
do lots of hustling around but accomplish
nothing.

"Knockers say,—." But your anvil is
making so much noise you can't hear what
they say.

"What is a horse worth without sound
feet?" asked the customer of the care-
less horseshoer.

To get ahead necessitates your running
twice as fast as to stay ahead. Stay
ahead—it's easier.

Benefit your community by helping
farmers grow larger crops. Handle fer-
tilizer as a side line.

The hustler gets there first every time.
Don't be satisfied with "second medals."
Turn on more steam.

Many a true word is spoken in jest, but
in the hands of the mischievous man the
baubel is a dangerous weapon.

"Once a month," said Thornton, "I come
into the shop as a stranger would and look
about. That's why my shop's clean."

Organization arguments will now especially
appeal to craftsmen. Roads are good,
the season prosperous; why not organize?

Hardly a day passes without bringing to
our notice a new side-line. A smith with
thirty colonies of bees is the latest. What
is yours?

The foolish ostrich buries his head in the
sand and thinks he is out of sight. We
have known people to act in just about the
same way.

Did you ever try an ad in our "Wanted
and For Sale" column? It's a good way
to reach 25,000 blacksmiths, if you have
anything to tell them.

"There is so much good in the worst of us,
And so much bad in the best of us,
That it hardly behooves any of us
To talk about the rest of us."

On the peak of Red Mountain, stands
"Vulcan," the big iron man that repre-
sented Birmingham at the St. Louis World's
Fair, a most imposing statue.

A nice profit can be made on the side by
any smith who will cultivate ability in
ornamental iron work, providing his com-
munity has any artistic taste.

Count each day a little life and your
whole existence but a day repeated. Do
each day's work as though it were your
last—improvement will be inevitable.

Do you? It is the secret of success in the
business world of today. Try it and the
inevitable result will be a marked increase
in business. Again, we ask, do you—
Advertise?

'Tis a fact we've often noticed, that the
progressive craftsman and the man who
never lets the subscription to his favorite
trade paper run out, are one and the same
person in every case.

Figure out how much clear profit a few
pennies raise in prices would mean to you
in a year. Isn't such a raise about due?
Talk it over with the other shops. Then
do something.

Springs tonics are good things—not only
for men but for their business as well. A
few bottles of "advertising" will do a lot
of good at this time of the year. Shake
well and administer freely.

What do you know what would interest
AMERICAN BLACKSMITH readers? Perhaps
you can tell about some peculiar shop,
some odd smith or some queer job. If so,
send it in. We'll fix it for publishing.

The stitch in time may be a shingle on
the roof, a bit of paint on the walls, a

plank in the floor, or a thousand and one
other small but important items connected
with good shop management.

According to German papers the Chinese
Government has granted its first patent.
Singularly enough it is for an electric light
and the land of the Celestial bids fair to
experience a little enlightenment.

A South Dakota smith says: "THE
AMERICAN BLACKSMITH don't rob Peter to
pay Paul, but does business on the basis of
reciprocity, in which its readers enjoy
inventions and experiences, world wide."

Your credit is an asset in your business.
Keep it good always, even if you have to
press some of your own customers to get
the money to pay your bills when due.
Some smiths seem to forget that their
trade is a business and that it must be run
on business principles.

Labor-saving devices are invented daily.
The newest is a machine which will turn
out 10,000,000 matches a day, requiring
but three or four men to run it. At first
sight it seems as though labor would suffer
on account of such improvements but in
most cases the consumption of the product
grows quite as fast as the improved methods
of manufacture.

In rush times the problem confronting
the boss smith is to obtain good men. It
is especially difficult because good helpers
are not often out of a job. Progressive
craftsmen in small shops are solving this
problem by installing gas engines, not only
to "take the peak of the load," but also to
increase the load they can carry, that is,
the amount of work they can turn out.

A well known authority on horseshoeing
says: "A shoe accurately fitted to the
hoof is an advertisement which will pay a
hundred per cent. for the labor invested.
Get a large sign painted thus: 'We fit
the shoe to the hoof, not the hoof to
the shoe,' hang it up in your shop, live
up to your promise, and you'll not prick
one horse in every thousand your shoe."

A company is being formed to market a
permanent mold for casting iron, invented
and patented by P. H. Griffin of the New
York Car Wheel company and Joseph
Miska, a mechanical engineer. The new
mold does away with the old sand con-
trivance and greatly lessens the labor. It
is claimed that five men with the new
process molds can turn out as much work as
100 men could by the old system. The
new mold is constructed of iron and
receives a chemical preparation which
prevents the molten metal from clinging.

A new process for hardening iron is said
to have been developed by two Prussian
inventors. It consists in adding to iron
a small percentage of phosphorus com-
bined with a large amount of carbon.
The iron is heated in a tempering powder
consisting of bone dust, to which are added
300 grains of yellow prussiate, 250 grains
of cyanide of potassium, and 400 grains
of phosphorus. The receptacle is closed and
luted with clay, and raised to a clear red
or white heat. The material treated is
then taken out and plunged, while still hot,
into a warm bath. It is claimed that this
will harden the surface of the iron so that
it can neither be cut nor chipped by the
best steel used, but that it can be very
readily welded and otherwise manipulated

American Association of Blacksmiths and Horseshoers.

Several times of late the association has called the attention of the craft to the flourishing county organizations recently formed throughout the country and interesting accounts of their progress have been published in this column. It is hoped that these examples will have the desired effect and be followed by other members of the craft who as yet have not comprehended the advantages of organization. It should be the desire of every wide-awake smith to see the craftsmen in his vicinity joined in a similar association, for there is no reason why the blacksmith should not be getting better prices for his work. Of course, the association does not advocate an unreasonable advance, but would like to see the American craftsman getting just compensation for the labor he performs.

Plans for the formation of a strong and beneficial association will be sent upon request to any reliable smith who is willing to act as organizer in his vicinity. We invite progressive smiths to correspond with us and give us their opinion on this important subject. Address Post Office Box 974, Buffalo, N. Y.

It is admitted that we live in an age of advancement and improvement, but to keep up with the times the smith must

Association has studied this question in every phase and since the movement for better prices was first started, much good has been accomplished for the

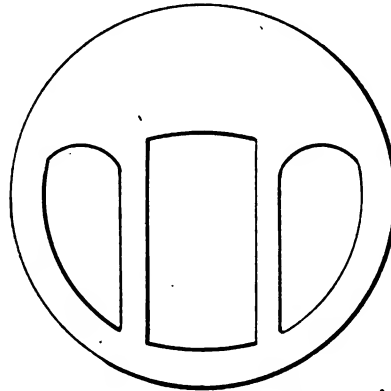


Fig. 1.—SHOWING THE BALANCE WHEEL WHICH IS PLACED ON CRANK THROW.

craft. The work is slow but sure, and in time is bound to elevate the craft to the position it deserves.

The Forging of a Crank Shaft.

C. H. RICHARDSON.

This style of crank shaft is used mostly in tug boats. To control and balance the throw of the crank, there is placed on one of the slabs of the throw, a balance wheel, as shown in Fig. 1. There are notches in the rim of the wheel for use with a starting bar.

The flange, A Fig. 2, is to form a coupling through which bolts are placed to

the shaft. This style is well recommended; for instance, if it is necessary to take the shaft out, the coupling can be drilled and broken on one side and taken off. When replaced, two rings of flat iron are shrunk on, thus holding the coupling together.

The five collars shown at B are termed a thrust bearing. These collars rest in a cast iron block when in place. Their use is to prevent the entire shaft line from moving forward or backward. The throw at C is of course the most essential part of the shaft. It is by this that the engine gets its power to run the propeller or whatever is connected to the coupling. The two shafts R and D, Fig. 2, are made to rest in journals on each side of the frames.

Now that we understand our drawing it is necessary to figure the material that is required to forge the shaft. A 15-inch billet will be right in this case. Now add the dimensions of the required shaft and mark them on the bar so they can be seen when the bar is hot.

First heat and round the stock to the size of the coupling. Then mark the bar all around to form the coupling. Now reheat and fuller down, as shown at 2, with spring fullers. This plan of reducing is first to get a good square collar, and second, when reheating to cut finished work off, it does not require

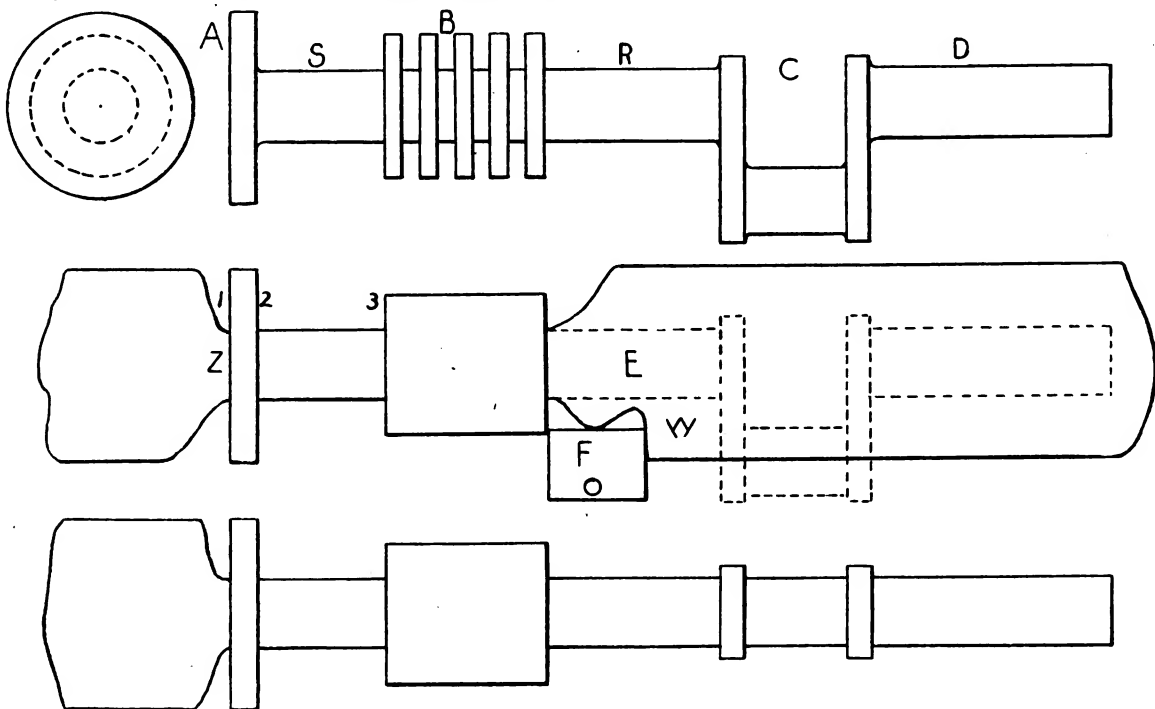


Fig. 2.—SHOWING THE VARIOUS STAGES IN THE FORGING OF A CRANK SHAFT.

be up and doing. We cannot enter too strong an appeal to the blacksmiths and wagon makers of our country to open their eyes, look about, see the opportunities before them and make haste to grasp them. The American

fasten on to the propeller shaft or if the distance is too great intermediate shafts are put in. These shafts have collars forged on each end. Sometimes the collars or flanges are made of cast iron, bored out and shrunk onto

as much time to heat it. Next, knowing the amount of stock that it will take to forge the shaft at S, and the collars at B, forge the material down to the size of the thrust collars at B, Fig. 2. Now finish the shaft between the

coupling and the thrust collars, mark the length of the thrust collars and fuller down as at E. Next, flatten the remainder of the billet to the size of the throw of the crank, being careful to keep the throw part wide enough, as the tools reduce the width at least one inch while the stock is being shoved through, as shown at E and F.

Having the slab ready for the throw, mark the length of the stock required to make the shaft marked R and when hot, fuller as shown at W. Now mark the distance across the throw and fuller D the same as at W. Now draw and finish. It has been proved by experience that it is not safe to cut the throw out in the forge shop, but to leave it solid and remove it in the machine shop either by sawing or drilling it out; the object being to do away with as much strain on the pin as possible.

The following rule for estimating the stock, I have found to be as near accurate as any I have known and much simpler. One cubic inch of iron weighs 28-100 of a pound. To find the cubic inches in a square piece or any flat stock multiply the width by the thickness and this by the length. Round stock,

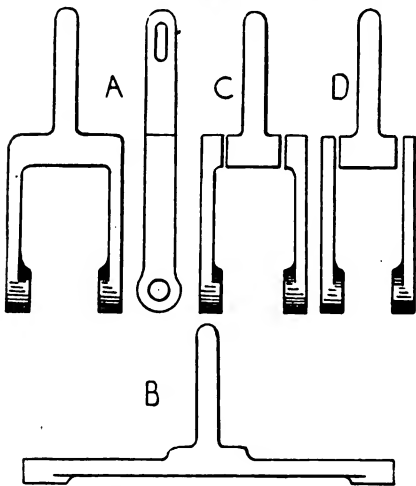


Fig. 1.—SHOWING THE CORRECT AND INCORRECT METHODS OF FORGING A SPRING FORK HANGER.

square the diameter times .7854 times the length.

Stock required for the shaft.

	size forged to in inches.	cubic inches.	pounds.
Part D	6½ by 20	676	=189.25
" R	6½ " 24	711.2	=199.25
" S	6½ " 16	540.8	=151.5
Coupling	14½ " 4	627.2	=175.75
Thrust Collars 12½ " 18	=7812.5	=787.5	
Throw & Pin { 8½ by 19 by 19	=3153.5	=883.	

8521.2=2386.25

The number of cubic inches required is, 8512.2. This divided by the number of square inches in the end of the billet, or 225, gives us the length of the required stock, or 37.872 inches.

The spaces at either side of the

balance wheel shown in Fig. 1, are to lighten one side of it and to balance the throw evenly in any position.

The Making of Irons for Branding Cattle.

J. C. SHAY.

It may be interesting to some of my brother craftsmen to read about the stock brands which I have made. They are used for branding cattle, horses and hogs. The customary size of the letters or characters is 2½ inches long. I usually make them from ¾ by ¾-inch Swedish iron, hammered to a sharp edge on one side. The braces to hold the letters or characters are made of ⅝ inch rod iron and welded onto a ½-inch handle about 2½ feet long. The styles of characters I have been called upon to make have ranged from a triangle to the outline of an anvil and from a double I to combinations and complications of two and more letters. I charge from \$2.50 to \$5.00 according to the characters I am called upon to make.

Some Miscellaneous Locomotive Forgings.

W. B. REID.

A fork spring hanger, a locomotive part familiar to all railroad blacksmiths, is shown at A, Fig. 1. In making it, the more precise forms of shop practice would probably require it to be forged entirely from the solid, as at B. While theoretically the best way, it involves a somewhat complicated piece of forging which can be avoided by the smith who has faith in his ability to weld. A simple and quick way of doing this is shown at C. The center part and the two sides are forged separately, as shown. This simplifies the forging, and when thoroughly welded by two separate heats, supplemented by two good side heats, will never break apart at the points of the weld. If the side pieces were forged as at D, Fig. 1, a good job could not possibly result, a weak spot and a "cold-shut" in the inside corner being the inevitable result. Forged as shown at C with projecting bosses, a strong filleted corner is obtained.

A coupler yoke, used on many locomotives, forged and welded in the same way as the spring hanger just described, is shown at E, Fig. 2. The same article forged in two halves and welded is shown at F. This, it is very evident, involves the forging and shaping of two complicated parts before welding, and is in no way superior, when finished, to the method of welding shown at G. By the method at G, Fig. 2, the job can be done in much less time and is more substantial and solid. After welding,

as described in the case of the spring hanger, the triangular piece between the jaw is cut out with a cutter of similar shape, under the steam hammer. A square block of proper proportion is then inserted and the ends bent round completing the piece, as shown at E. A coupler yoke of a different shape is shown at H, Fig. 2. This can also be

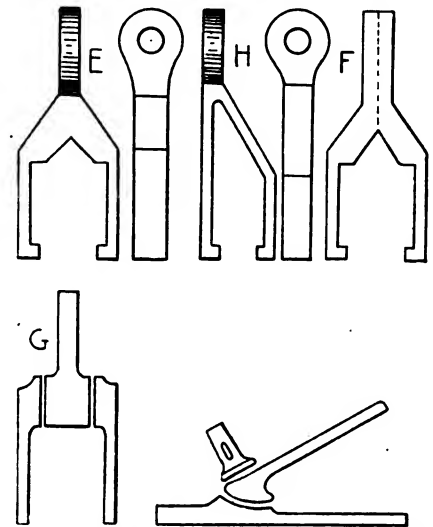


Fig. 2.—SHOWING METHOD OF FORGING COUPLER YOKES.

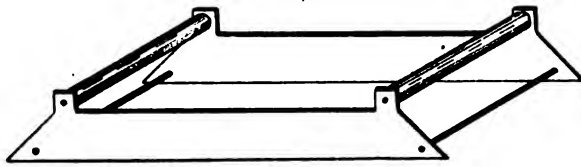
forged in two equal halves and welded as at F, but a simpler and quicker way is that shown at K. This simplifies the forgings and with good heating and efficient manipulation ensures a good job. These forgings, it may be said for those not acquainted with this class of work, are of considerable weight, the spring hanger in Fig. 1 weighing from 35 to 60 pounds and the coupler yokes in Fig. 2 from 75 to 85 pounds. In such cases, especially the latter, welding is necessary for speed and economy. The methods will naturally vary according to the skill and experience of the mechanic. The writer has successfully followed for years, the methods he has described.

Another Windpower Shop.

J. A. ELDER.

I see by your paper of April that you have found a man who runs a blacksmith shop with a windmill and with your permission, I must tell you that he is not the only man that has harnessed the wind to his shop for I too have a windmill harnessed to my old curiosity shop and it runs a blower, a drill, an emery wheel, a polisher, a rip saw, a home-made planer or joiner, a universal boring machine and a disc sharpener. The wheel of the mill is 14½ inches in diameter and makes about one horse power when the wind is blowing fifteen miles an hour. The only objection to

the windmill is the variable speed which causes some trouble in blowing the fire, but I have partly overcome this by using a car pulley and shifting lever for the belt which runs the blower. It is also a little dangerous to run the emery



A HANDY DEVICE FOR HEATING TIRES.

wheel on windy days, for it sometimes runs so fast that the wheel is liable to burst and again it will stop altogether when the wind goes down. I found it rather annoying when one has work to do, to turn the drill by hand and to wait until the wind comes up before doing any polishing. I therefore bought a gasoline engine for use when the wind does not blow. I use the windmill about six times as much as the engine. The wind costs nothing and makes very little noise, while the engine is noisy and expensive, besides requiring some watching. The windmill requires no attention further than to turn it into gear and shut it off when the work is done.

A Handy Device for Heating Tires in the Forge.

L. E. PRIFER.

The accompanying illustration shows a very handy contrivance for handling tires while heating them in the forge. The sides or frame may be made of any suitable sized stock and should be of such dimensions as best suited for the work usually done. The device consists of two rollers held in a frame which in turn is held together by two rods. It is hardly necessary to explain further, except that the stand may be made any size or weight. It would probably be preferable, if much tire work is done, to have a stand like this for light tires and also one for heavy work.

A Handy Tool for the Carriage Repair Man.

R. O'HEARN.

The accompanying illustration shows a tool for cutting and punching out old or broken rivets from bow sockets. Heretofore it has required two to do this job, but with this tool the work can be done quickly by one. In the engraving, A is the tool frame, G is a punch, H is a set screw which may or may not be used. A chisel which is used to cut off the rivet head is shown at B. A rivet set is shown at C. The tool frame A is large enough to hold comfortably in the hand

and still have enough weight for either cutting, punching or riveting. D, E and F are the anvils, D being rather a punch block, as it has a hole in it to permit the punched out rivet to pass. F is the anvil for riveting, it having a countersunk place to fit the rivet. E is the piece to use when cutting off the rivet head. E and F are soft steel, while D is tempered at the top of the hole.

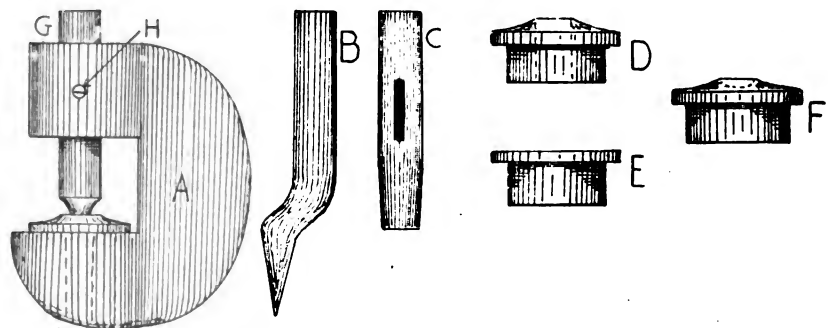
Promptness is a necessary factor nowadays, and this tool should not only prove a handy one in the carriage smith's hands but also a time and labor saver as well.

Battery or Dynamo for Electric Ignition.

E. W. LONGANECKER.

The question in the minds of almost every blacksmith who contemplates the purchase of a gasoline engine, "shall I use a battery or dynamo for generating the current for spark purposes" is usually settled by the person of whom the engine is bought. Many times this is an agent who knows little about the real merits of the device which he is recommending and, less about the adaptability of certain appliances in special cases. Consequently, all blacksmiths, who buy engines, do not get the sparking appliance best adapted to their requirements. Convenience and close proximity to an electrical supply house which handles all kinds of batteries and battery supplies may be an inducement to employ either a dry or fluid battery. But the country blacksmith who is not so located that he can in five minutes call at a supply house, select and procure his requirements,

least expense and trouble is the one to select. But this selection is not always easy to make. What one blacksmith would consider a great deal of trouble and care would not be regarded as such by another, but rather a pleasure on account of the attention necessary and the satisfaction of knowing all about his device. The fluid battery, for instance, when properly set up and connected to the engine, perhaps requires no attention whatever for the next six months or year. One needs to know nothing at all about it and aside from switching on and off the current when starting and stopping the engine, it requires no attention until it is exhausted. Then a renewal is necessary. Some blacksmiths prefer to stand the expense of renewal rather than to have an appliance that they must learn all about and give their daily attention. They argue, and with considerable favor on their side, that they can employ their time so profitably on something that they are already familiar with, that they can bear battery expenses and even employ an electrician to do the work of renewing. But the other fellow with a different idea of economy will employ the little dynamo or magneto and treat it and care for it as tenderly as if it were the delight of his heart. He covers it up with a rubber cover every night and in fact uncovers it only when it is in use or when he wants to give it some necessary attention. He looks after the oiling of it regularly and carefully. He keeps it free from gum, dust and dirt. He looks after the brushes every day or two to see if they are behaving properly, and soon learns by close observation and attention what is



A HANDY TOOL AND ITS ATTACHMENTS FOR THE CARRIAGE REPAIR MAN.

might wish to leave this matter of inconvenience of location entirely out of consideration and select something with a view to the highest degree of economy and the best service. In fact the matter of economy is usually the basis upon which the selection hinges, and the device which can successfully produce an igniting spark at all times at the

best speed for his little dynamo and adjusts it accordingly.

This is a picture of two blacksmiths, one using a battery, the other a dynamo on their engines, and both happy and succeeding nicely with them. The one knowing nothing about and paying no attention at all to the current generating appliance on his engine, the other know-

ing all about his because he bestows considerable attention upon it. The one pays his six to eight dollars in cash perhaps every six months. The other puts from six to eight dollars worth of attention on his in the six months and has the satisfaction of knowing all the details of its construction and operation. This illustrates two methods of accomplishing the same results from two different appliances. The blacksmith can decide for himself which he will use by knowing the advantages and disadvantages of both. The advantage of the fluid battery is that it requires practically no attention until it needs renewing. But the operator must be on the alert and notice when his engine begins to misfire or it may give him much trouble and worry for a month or two before he discovers that his battery is weak and needs recharging or rather renewing. Then comes the disadvantage of paying out your cash and going through the process of renewing. The dry battery does not last as long as the fluid battery, but it has the advantage of being much cheaper and is more easily renewed. The cash cost of renewing the fluid cells generally used, will buy five or six sets of dry batteries and on an average it will take just about that many sets to equal one recharge of the fluid batteries. When one set of dry cells are exhausted they were simply thrown away and replaced with a set of new cells instead of attempting to recharge the old ones.

The advantage of a well made dynamo is that with proper care it will generate a good current for years without a cash outlay, and even if the igniting points are not in contact all of the time the current will not be weakened or used up or become exhausted as in the case of the battery. With the battery care must be exercised unless it be left on short circuit when the engine is not in use. With the dynamo there is no current when the engine stops.

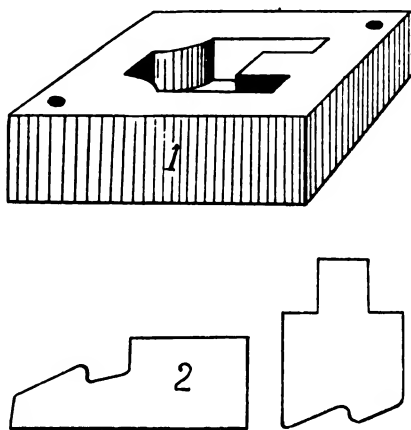
Not all dynamos or magnetos will generate sufficient current while turning the engine over by hand to make a spark. Consequently on such the engine must start from a battery and when the dynamo has gained sufficient speed its current is switched on and the battery current switched off. In selecting a dynamo be sure to choose one that produces a sufficient and guaranteed starting current.

The Hardening and Tempering of Dies.

W. P. WOODSIDE.

The hardening and tempering of press dies and punches requires considerable

skill on the part of the smith to give satisfactory results, as the shapes and sizes of a great many of the dies are such that square corners and projections are mostly to be contended with. The first thing the smith must do, in order to be successful is to size up the piece that he is going to harden. If there are square corners in the piece, which it is not necessary to harden, place a piece of wire in them. This will prevent the starting of a crack. If there are dowel pin holes, cap screw holes or any holes which do not need to be hardened, fill them with fire clay. If it is a small, thin die it will not require as much heat to give it the desired hardness as would a big thick die. If it is a blanking die, find out what kind of material is to be used on it. If it is a forming die, remember that it is not intended to carry a



THE HARDENING AND TEMPERING OF DIES.

keen cutting edge, but that it must stand up under considerable pressure and the constant blows without the forming part breaking. The same applies to the punch for a forming die. If it is a punch for blanking die, the punch, in most cases, should be softer than the die. The reason for this is that the dies generally cost considerably more than the punches and should punch and die accidentally get foul of one another, it is preferable to have the one costing the least be the one that is sheared or spoiled. Of course should the punch be the more expensive of the two and of the shape that will stand it, leave it harder than the die.

If the punch is a long, slim one to be used on heavy stock, it must be made hard as far up as it is weak so that it will be stiff enough. If the punches are small, say $\frac{1}{16}$ to $\frac{3}{16}$ -inch, you must remember that it takes less heat to harden them than it does a piece $\frac{3}{4}$ or one inch and most essential of all, heat the steel slowly and evenly to as low a heat as it will harden at sufficiently.

Use a fire large enough to heat the entire die at once, for if your fire is small and you have to be moving the piece back and forth in order to heat all over, an uneven heat is sure to be the result. With an uneven heat you have an uneven grain and you also set up strains through the piece which may cause it to crack in the cooling or shortly after you take it out of the water. If you use too much blast and force the heating of the steel, you then heat the corners and projections faster than the center or body of the steel. This will cause an undesirable strain during the cooling operation.

Have the bath of clean fresh water or salt and water. Warm the bath according to the piece you are hardening. Never use it ice cold, as too sudden a change is liable to crack the piece and leave it very brittle. About 60 to 70 degrees Fahrenheit is right for ordinary work, but pieces with light projections need a warmer bath, perhaps 90 to 100 degrees.

I prefer a muffle furnace for heating dies, as the piece does not come in contact with the sulphur in the coal nor is it exposed to the air as in an open fire. Pack hardening is also a good method where there is a lot to do. This consists of packing the pieces or pieces in a metal box with charred leather and charcoal packed tightly around them. Test wires run through the box which is then covered and sealed with fire clay. The box is then put into the furnace and heated until the desired heat is reached. This may be ascertained by drawing one of the test wires. I will explain this process later.

I will now explain my method of tempering a die in an ordinary fire. For instance, we have a die as shown in Fig. 2. I have my fire built up with coke large enough to heat the entire piece at once. I lay the piece on top of the fire, turning it over occasionally and using a very gentle blast. Now I cover it up in the fire and shut off the blast until it shows an even red heat all over. I then turn on the blast a little stronger than at first, and turn the die over often so the heat will come evenly up to the hardening heat. I now grasp the die at one corner with my tongs and plunge it into the hardening bath, moving it back and forth until it is cool. I now turn on the blast fairly strong, take the die out of the hardening bath and hold it in the flame of the fire, turning it over and moving it back and forth until it is almost too hot to handle with the bare hands. This

warming is to make the outside a little pliable and thus to prevent cracks from internal strains or from changes that may take place inside. Now I lay a plate on top of the fire and place the die on it while drawing the temper. Next, I brighten the top of the die with emery cloth and then rub over it with a piece of cloth with just enough oil on to dampen it. Now I lay the die on the plate and keep moving it around until a light straw color appears or so a fine file will take hold of it. I then plunge it into an oil bath and leave it there until it is entirely cool.

For a forming die as shown in Fig. 2, I let it lay in the fire a little longer after it is red and take a little longer to bring it up to the hardening heat. This is to allow the hardening heat to penetrate well into the piece, thus preventing settling. I draw the temper on them very little, just relieve the strains, say to a very light straw, or so the corner of a very hard file will just cut into them.

Electricity in a York State Shop.

The accompanying engraving is an interior view of Mr. J. G. Kerr's shop at Tonawanda, New York. The building is 90 feet long and 30 feet wide and contains two fires. Electricity is used for lighting this shop and although no power is at present employed, Mr. Kern says he is going to put in a gas engine the coming summer.

The shop in question is one of the few still found in the smaller towns, where horseshoeing is made a specialty. Where sufficient work of this kind is found, the craftsman does well to make it his life-work. However, as most localities do not furnish enough trade to keep a shoer busy all the time, the smith makes no mistake by profitably employing his spare time with some good side-line.

Profits Not The Only Consideration in Horseshoeing.

FREMONT KELLEY.

When shoeing a horse, do not think first and foremost of the profits likely to accrue from your labors. True it is that some smiths think of nothing but to shoe the horse and get their pay. Then this smith waits for the next customer. Possibly the first horse had feet "like iron" and most anything nailed to them would not injure them. The second horse, which he has never shod before, has been to every shop in town without being successfully shod. Of course our smith shoes him the same as the first horse (for what he can make out of the job), and again the horse is imperfectly shod. And so the animal is

taken from one shop to another of these think-of-pay-only smiths until, should the horse fall into the hands of a conscientious, animal-loving smith, it is next to impossible for him to relieve or cure the poor animal of the contraction, laminitis, corns, and unbalanced feet caused by the persistent faulty shoeing. Undoubtedly the animal will go worse than ever, after the latter smith shoes him and of course the owner changes shops again and thus the work continues until the animal is finally taken to the bone yard.

I believe it the duty of every smith to study the various ailments of the horse and not only try to get the immediate cash, but also to endeavor to improve his standard of work and to pass his experiences on to his brothers.

They are Never Out-of-date.

M. T. CHABOT.

A young man, especially, should know how absolutely necessary it is for a blacksmith to learn by the experience

his article certainly helped me very much. I wanted to get a good strong grain and did not want to strain the stock any more than I would have to. This is only one instance. I could cite dozens of others where THE AMERICAN BLACKSMITH has given me advice that I would gladly have paid \$1.00 for at the time of need. So I say to AMERICAN BLACKSMITH readers, refer to back numbers, they are never out-of-date.

Shoeing Horses With Mule Shoes.

T. J. WALLACE.

I want to ask my fellow smiths about shoeing horses with a shoe made like a mule's shoe. I never do it because I don't think it's correct, do you? Why do so many of the craft use hind shoes altogether instead of front and hind? If customers could understand the importance of front shoes on the front feet and hind shoes where they belong, I believe there would not be so much of this changing practiced. For instance, take the horse that has never been shod,



A YORK STATE SHOEING SHOP.

of others and otherwise as much as he can about his trade. Read THE AMERICAN BLACKSMITH and find as I do, that all articles are so written as to be easily understood and that even with little education he can instruct himself in his trade by watching well that AMERICAN BLACKSMITH.

I keep my back numbers, and a few days ago, hunted out volume 3, number 1—February, 1902—to see what Mr. J. L. Bacon had said about bursting or splitting stock in drawing out. His example was three-fourths of an inch round iron at the anvil. I was working five-inch round steel at the 1000-pound steam hammer, but the explanations in

examine his feet—the front feet are round as God made them; the hind feet are more pointed. Now shoe this horse three times all around with hind shoes and then at the fourth fitting let someone mix the shoes and you can't tell which foot they were fitted for. Soon the poor horse is all pinched up, the side walls of the foot are cut and rasped away, the walls are weak, and the horse favors first one foot and then the other until he becomes trading stock.

Why is it that almost every shod horse you see is pigeon-toed, that is, high and long on the inside of the foot. The horse generally wears heaviest on the outside and most of our smiths fail

to remedy this because they first nip off the outside of the foot and this should be last. My method is first to examine the foot, pull the shoe and then let the foot down on the floor, which should be a plank or good hard, level floor, for a more careful examination. I begin cutting at the inside heel and cut around to the second nail hole from the toe on the outside. You will find in almost every case that just a little levelling with the rasp is all that is needed. I invariably fit all my shoes full and wide on the outside of the foot and the front in particular.

As to interfering, I am generally very successful. The past week I had two severe cases brought to me from one of our livery barns. These horses had been shod by a cheap John. The hind legs of one were swollen to fully one third their normal size and were so sore and painful that the animal could hardly endure the work done on its feet. I never lower the foot more on one side than on the other, but aim to get a level foot. If I haven't foot sufficient to level, I use light sole leather or calf skin. When once the foot is level you are almost sure of success. Fit the shoe full and easy. In both the cases I mentioned above, the horse now travels free and easy.

In conclusion I would say: brothers, speak out in meeting and help one

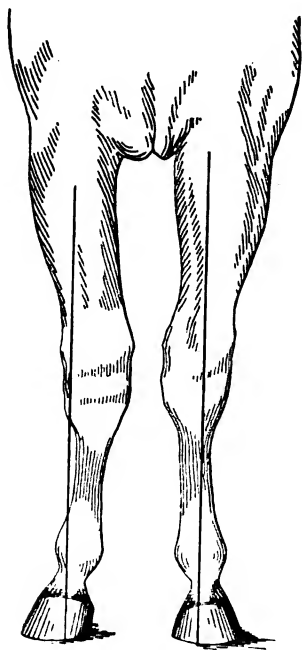


Fig. 1. NOTE THE DIRECTION OF THE PLUMB LINE.

another. We are all proud of a good, sober, truthful smith, one who seeks information, converses intelligently, does a good honest job and then demands a good honest price for it. If any mechanic on earth deserves good pay

the smith does. Our trade is one of the most difficult to learn and handle successfully. Keep your shop clean, tools in place, a daily paper on the desk and THE AMERICAN BLACKSMITH convenient at all times.

A Persistent Knee Knocker.

E. W. PERRIN.

Knee knocking, as its name implies, consists in the animal striking the knees

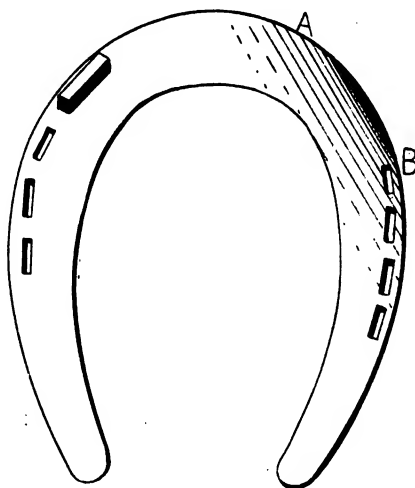


Fig. 2. LIGHT PLATE FOR LEFT FRONT ROLLED BETWEEN A. AND B.

with the opposite foot or shoe; generally but one knee is affected. As with most other forms of interfering, it is invariably the result of defective conformation of the limbs. It is most commonly met with in narrow chested horses with high action, or it may result in a horse with legs set wide apart, but toe-wide, in fact it is mostly in the toe-wide horse that we find this trouble. The case which forms the subject of this article has a full width of chest, but is toe wide with a twisted cannon bone on one leg, but the fellow leg leans in at the knee joint, see Fig. 1—the limb is not perpendicular. In going, this horse describes a semi-circle to the inside with both front feet. He looks most awkward in going and strikes one knee but moves fast. The animal hits the right knee with the left foot.

This is one of these cases where one foot is naturally high on the inside, while its fellow is high on the outside. By allowing the toe-wide foot to break over on the outside quarter, it is materially assisted in passing clear of the opposite knee, therefore in the preparation of this foot we leave the inside of

this hoof a little high. I shod this foot with a very light plate with a small calk welded on the inside toe, and rolled the outside toe and quarter at the breaking over part, see Fig. 2. On the opposite foot I use a light plain shoe with the outside of the foot a little higher than the inside. This treatment accomplished the desired result and the horse goes clear. This is a remarkable case, inasmuch as the animal had given his owners a lot of trouble by striking and had caused the knee to swell considerably which made it the more difficult for the opposite foot to pass clear.

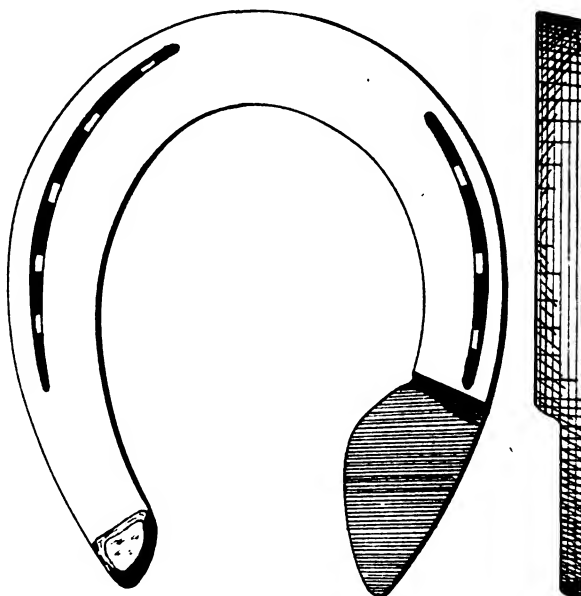
The knee knocker is a high stepper, hence in shoeing him we should use as light a shoe as possible, because if the horse can be made to step a little lower, the foot will pass under and miss the prominent part of the knee, there being more room to pass between the fetlock and knee. This is why the Charlier shoe is so successful for some knee knockers, but its use is not admissible except on feet of excellent quality.

A Good Shoe For Corns.

M. KEPPLINGER.

The accompanying sketch shows the shoe I use for corns. This style of shoe takes the weight off the sensitive part of the foot and enables the animal to travel evenly without limping. Before I put the shoe on, I pare the hoof to see if there is blood or pus in it. Then I put cotton and a little tar, pitch or turpentine on the corn and the horse will be all right after three or four days.

When I find a horse interferes I exam-



A GOOD SHOE FOR CORNS.

ine the shoe opposite to the foot on which the injury appears and that part which glitters is usually the cause of the striking. Then I take this shoe off and file

the brightened part so the shoe is away from the edge of the foot. Now smooth up the entire foot and shoe with the file including the clink.

Several Pointers Upon Smith Work.

GEO. F. WHERRY.

I presume there are a great many blacksmiths who know all about these different methods of doing work, but I give these for the benefit of the younger craftsmen. In tire setting, of course I use an upsetter. First, I measure the wheel with the tire traveler, then measure the tire and make two center punch marks of different size. I then take and spread my dividers $\frac{1}{8}$ of an inch, or whatever draft is required, less the distance between marks and when tire is upset I use the dividers again instead of traveler to ascertain proper draft. To get the correct length of a sickle bar when welding without putting in a piece, punch holes near the ends that you desire to weld and rivet the bar with a rivet large enough so that when the sickle is welded it will be the length required. My method of tempering all hammers is to heat them to a cherry red and then plunge in water. If the hammer is high grade steel use tepid water. I have followed this method and find it to be successful nine times out of ten. My method of making horse shoes is not to crease them at all. I use a punch that makes a countersunk hole. The nails then drive down even with the surface of the shoe, making a very neat job. In making a bar shoe, I have known many shoers who could make a good one, but forgot to finish it. They neglect to punch the nail holes in the toe. When made properly the bar shoe requires only about six or seven nails with none in the heels, thus relieving pressure at the heel.

A Canadian Shop and Price List.

M. T. GREENWAY.

I commenced business in this country four years ago. Having no experience, I rented a shop and tools for the first year and went through all right. This year I have put in some machinery, a trip hammer, an emery wheel and a $4\frac{1}{2}$ -horse power Fairbanks-Morse gas engine. I would not do without my trip hammer. It is a Perfect Power. I am going to get a band saw and will then be able to do woodwork. My business has increased so that I could work a third man, but my power hammer takes all of the plow work.

I will give you some of my prices:

Plow lays 12 inches.....	\$3.50
" " 14 "	4.00
" " 16 "	4.50

Plow lays 18 inches.....	5.00
Setting shoes .....	.25
" " plow beams	1.00
Setting beams on plow bottom.....	2.00
Sharpening lays .....	.25 to .35
New tongues in wagon	3.50
Foot hounds.....	2.25
Reach	1.25

I have a nice shop, a very good set of tools and a good business.

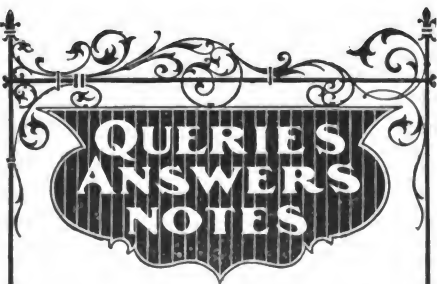


Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

Try this scheme for cleaning paint kettles: Dissolve half a pound of caustic soda in two gallons of clean water and then boil the kettles in it. This solution may also be used for removing paint from wood.

A peculiar job was brought to the shop the other afternoon which required the drilling of a very hard piece of steel. The boss first applied a well mixed solution of four parts of turpentine and one part spirits of camphor to the plate at the point to be drilled and drilled the plate with an ordinary drill.

The following has been found a very good method of recutting files at the shop. The files are first boiled for half an hour in a strong sal soda solution. They are then washed, dried and stood on end in an earthen-ware jar of sufficient depth and covered with a solution composed of four ounces of sulphuric acid to each quart of rain water. The files are allowed to stand in this solution from eight to twelve hours according to the fineness or coarseness of their cut. When taken out of this bath the files are again washed, dried and a small quantity of sweet oil rubbed on each to prevent rusting. Files have been recut as many as three times by this method.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants a Wood Planer—Will some brother blacksmith who has a good, second hand 14-inch wood planer please inform me of the fact?
J. E. MAYS.

To Upset a Channel Tire—Heat the tire and place a piece of flat iron in the channel that will just fill it. Then upset with tire setter in usual way.
H. E. KERNEK.

A Box for a Truck Tongue—I would like to have some brother smith tell me how to make a square box for a truck tongue, out

of iron $2\frac{1}{2}$ inches wide and $\frac{1}{4}$ inch thick, having the corners square. THOS. H. LONG.

Gunsmiths' Materials—In answer to Am. Ass'n. Smith I would say he can buy gunsmiths' materials of any amount and all kinds for different guns of M. Hartley & Co., of 313 and 315 Broadway, New York City.
G. Q. MORRIS.

Wants to Build a Tire Furnace—I would like to have some member of the craft explain how I might build an enclosed furnace for heating tires. I am in a windy part of the country and often have to postpone setting tires on account of the wind.
W. SMITH.

Boiling Rims in Oil—In regard to boiling rims in oil, will say, my opinion is do not get the oil too hot. I think if the oil is too hot, it has a tendency to kill the life of the wood, but if it is applied moderately warm it will penetrate the wood and preserve it to a certain extent, keep the water out and the paint will stay on longer. I have seen very light rims, such as $\frac{1}{4}$ -inch buggy rims, which, I thought, were damaged by boiling with oil which was too hot for them.
M. A. FOSTER.

An Interesting Letter from Nebraska—I have lots of work and a good shop 30 by 56 feet with an additional wing 30 by 18 feet. I have two fires, a Little Giant trip hammer, a Henderson tire setter, a 22-inch swing lathe with thread-cutting attachment, a drill press, an 18-inch rip saw, an emery stand, a 250 pound grindstone, a Little Giant disc sharpener, a Reynolds tire bolting machine, a tenoning machine of my own make and an 18-inch power blower, besides a lot of other little truck which a man can't get along without. My machines are run by a 6-horse power Weber gas engine.
ERNST SCHEER, JR.

A Permanent Cure for Borrowers—In answer to Brother Schurle as to neighbors borrowing tools, will say I had the same trouble until I adopted a plan which made them ashamed and has stopped their borrowing altogether. In the first place I made a black board $2\frac{1}{2}$ by 3 feet and hung it in my shop where everybody could see it. When a neighbor wanted to borrow a tool I would say, "Certainly, but I will put your name on the bulletin board that you borrowed my hammer, worth \$1.50, charged against you this 15th of April (or whatever date it may be), and if not returned in twenty-four hours I will leave the account for collection." This worked with the intended result.
AN A. B. READER.

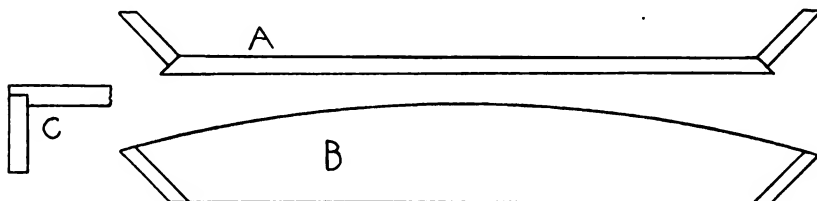
A Texas Shop and Prices—I have a well-arranged shop, 24 by 64 feet, with two fires, a band saw, an emery buffer, a power drill, a trip hammer and a pipe threader. My business is good, being along the line of general smithing and wood work. Our prices are fair, as shown by the following:
Plain horseshoeing.....\$1.25 to \$1.75
Wagon axles.....3.00
Wagon tongues.....3.00
Grinding lister shares......25
Buggy stubs.....7.00 to 8.00
Spokes and felloes......25
Setting tires.....2.50 to 3.00
Others in proportion. H. F. KUEHN.

Varnish Crawling and Apprentices—I would like to know the reason for varnish crawling on black. I use Masuay's Ivory Black in Japan, using rubbing varnish or raw oil for a binder, but find the varnish will crawl off a strip $\frac{1}{4}$ or $\frac{1}{2}$ of an inch wide. It is impossible to make it stay unless wet with a sponge or brush dipped in water. All other colors do not act that way. Why is it so? Is there any other brand of black in oil or japan that will not be afraid to have a shine put over its surface? If so, would be pleased to make its acquaintance. Does any of our brother wheelwrights employ apprentice boys 14 or 15 years of age

and if so what are the usual wages for a boy who is smart and wants to learn the trade? H. H.

A Case of Bad Hoofs.—Two years ago a customer of mine brought me a fine imported stallion to shoe, which he had just imported from France at a cost \$1,600. His hoofs at the time were so bad an ordinary number seven shoe, the size he should wear, could not be put on to stay long enough to get him home. I saw his hoof had a very thick wall, so I concluded to make a set of shoes creased on the inner edge instead of the outside. I was then able to get a good deep hold with the nails and at the same time could let the shoe fit flush all around the edge of the hoof and thus protect the wall of the hoof. I have been shoeing the animal for two years in this way and he now has as solid a hoof as any horse. I also made the shoes a little wider than ordinarily. K. L. KIBLER.

Wagon or Carriage Seat for Beginner.—In the accompanying illustration A is the plan of a seat board. Cut it the length and width required, then bevel back edge and each end $1\frac{1}{2}$ inches as shown. The back, B, and the end of the seat are dressed square on the bottom edge so as to fasten with screws on the bevel of the board. Fasten the back with two screws and then find the slant of the ends by fitting the ends of the seat to them. I do not mitre the corners, but cut three-fourths of an inch deep and fasten with brads. The method of fastening the corner is shown at C. H. H.



WAGON OR CARRIAGE SEAT FOR BEGINNER.

Tempering Brass Springs.—In answer to W. A. Mayfield's query how to temper brass springs, will say take a metallic vessel, cast iron preferred and put in enough white beach sand to just cover the spring when it is placed on its edge. Now place the pot or vessel on the fire and heat just enough to make the brass red in twilight. Remove the whole and allow to cool two hours or more. Then try the spring and if not stiff enough, replace, reheat and place where the sand will be from two to five hours cooling. Continue this twice a day until you have the required temper. If too hard remove the spring from the sand as soon as cold enough and allow to cool in the air. Much tin as an alloy makes it soft and little tin allows ease of hardening. A little experience in this line will bring you out all right. T. U. BALCAN.

The Bellows and Blower Again.—Which is the best way to put an arm on a $1\frac{1}{2}$ -inch crank broken in the collar, using the same arm?

Which is the better, a blower or a bellows for wagon work such as welding heavy axles, large tires and general work on heavy wagons? Would be pleased to hear from some brother who has used both blower and bellows on this kind of work.

How can you temper a butcher knife so that it will not spring, also the best solution for tempering it in?

Does a tuyere iron for a blower require to be deeper in the forge than it does for a bellows? If so, what is the right depth for each, taking into consideration that we are to use it for long heavy bars of iron as well as all work generally done in a country shop? D. A. DUPLISEA.

Laying out a Wooden Axle.—In the March issue of THE AMERICAN BLACKSMITH Mr. B. Robley tells how to get the pitch and gather of an axle, but I wish to differ with him. In the first place he would have just twice as much gather as he should to make a wagon run easy. He would have the pitch very nearly correct for a common D. V. Skein with a very straight wheel, but with some other makes of skeins, especially those that are large at the point or with a wheel that has considerable dish he would have what wagon makers call a plumb spoke, without which a wagon cannot run easy. The only sure way with all kinds of skeins and the different dish in wheels is to lay out your axle by the dish of the wheel at the center of the arm, then you are sure that the load stands on a plumb spoke. Then give $\frac{1}{4}$ of an inch gather and you have an easy running wagon. GEO. W. HOPKINS.

A Short Item on Horseshoeing.—There is a very necessary tool I use that you don't see in a shop and that is a scientific foot leveler to tell when you have it level and both the same size. You can buy one for \$3.00 and a man can't do first class work without one. The greatest importance in shoeing is to get the foot in the right shape. If the foot is worn out you are compelled to fill it up sometimes and make the shoe especially for that foot until it grows out. For interfering or any of these troubles you can do more good by dressing the foot the right shape than any other way, but when you have no foot then you are compelled to do the next

and put a bolt through the runner and the shoe, screw up tight and your job is done.

To remove whiffletree hooks that screw in the end and break off at the thread, drive off the ferrule and saw into the end with hack saw. Take screw driver and back the piece out. Drive your ferrule back and you are ready for another hook. I have sawed into the end of a wagon axle and turned out the skein bolts where they were broken in the same way. R. N. NORTON.

Amount of Stock for a Ring.—In answer to Mr. John Padberg's query I will endeavor to show him how to calculate the stock required. As the outside diameter of the ring is to be 5 inches and the ring is to be $\frac{3}{4}$ of an inch thick, we must calculate our diameter from center to center of the stock. Therefore the diameter to figure from will be 5 inches minus $\frac{3}{4}$ of an inch or $4\frac{1}{4}$ inches. Diameter times 3.1416 gives circumference in all cases, therefore, $4\frac{1}{4}$ inches times 3.1416 or 14.53 inches is the circumference. In bending stock of the given size, about $\frac{1}{4}$ of an inch will be taken up and in welding another $\frac{1}{4}$ of an inch will be taken, so that $\frac{1}{2}$ of an inch must be added to the calculated circumference. Therefore 14.53 plus .75 equals 15.28 inches. This gives a result of a trifle over 1 foot $3\frac{1}{2}$ inches, but to provide for not getting the weld down to the same size as the rest of the iron, I cut off my stock 1 foot $3\frac{3}{4}$ inches long. When the ring is rounded up it will be found to measure near enough 5 inches outside diameter for all practicable purposes. THOS. TULLETT.

That Record of 85 Horses.—I notice H. I. Murphy in April AMERICAN BLACKSMITH stating that I claimed 85 horses as my record for one day's shoeing and I also notice THE AMERICAN BLACKSMITH of February doing the same. If the editors will just refer to my letter they will see that the error is theirs, not mine. Eighty-five horses was the number I shod during the month up to the 23rd of December, the time I wrote THE AMERICAN BLACKSMITH. For one man to shoe 85 horses in one day would be an impossibility. The highest number, I ever shod in ten hours was fifteen and I am considered very fast. I have shod twenty-one with my father's assistance. I have no desire to come to Iowa to prove my ability as I have plenty of work here. ADAM T. WIBLE.

EDITOR'S NOTE.—Through one of the mistakes usually laid at the printer's door the statement appeared as Mr. Wible says. We are glad, however, to give the same publicity to Mr. Wible's letter of explanation as was given his first statement.

A Few Words on Shoeing.—I have met with good success in shoeing interfering horses, yet, I always make the shoe as near perfectly round as possible. I will try to explain what I mean. I never make a shoe as Mr. C. D. Briddell shows in the February number making Y to M a straight line or almost so, as Y and M are corners. I was always told to keep a shoe round and not get kinks in it. When Briddell made that shoe, what became of that round part of the hoof from Y to M? I think the horse wanted that so as to stand square. Fennimore Cooper says man interferes with nature and when I see a shoe of the shape used by Mr. Briddell I think Cooper knew something. I have not seen all the feet in the world, but I have never seen a hoof that nature did not make round. Of course some are longer than others. I think the plainer a man shoes a horse the better. A question I feel like asking of some owners many times is, "Has that horse been fed." A man brought a horse to me once that interfered fore and hind. He had just bought it. I looked at it carefully and then said: "Well, sir, I can't do the animal any good. I can take fifty cents from you,

best. A case of hitting at the pasterns was brought to me after others had tried and cut the feet until I had no chance to cut any so I was compelled to do all my work on the shoes. I made special shoes, succeeded and held the job. A. M. SPEER.

Pointing and Sharpening Plows.—A dull or worn point looks like A in the engraving. To properly sharpen, it should first be hammered as at B, i. e. the point driven away from the land side. Next, it should be driven toward the land side as at C and then drawn out and finished as at D.

The reason for doing this is explained as follows: The worn point, though dull, is thin at the extreme edge and much worn on the land side. Some smiths simply draw the point out and don't pretend to make it again look as it did when it came from the factory. They leave the point round on the land side so that every root will turn it into the furrow. Every farmer knows that this is all wrong and my style or method gives general satisfaction. To get the point thick and properly shaped again for sharpening, the illustrated method is the only way. RICHARD O'HEARN.

Several Hints from Michigan.—Our past winter was a poor one but the spring has started out good. Our prices are a little lower than they ought to be. This is due to no other cause than the mechanics themselves, but they are now beginning to see where the trouble lies. One will get no more than he asks for his services and must be contented with that.

I see one smith wants to know how to drill a chilled sleigh shoe. In answer I will say, I drill from the top or runner side until I strike the chilled part. Then tap it out

but you will have to stop that horse from interfering by feeding him." Of course I knew this man. This happened three years ago and the horse has never interfered since. Using dividers in resetting tires is all right; I have tried it. I am willing to learn and have learned some things from the AMERICAN BLACKSMITH which I read regularly.

JOHN MULLARKEY.

On Repairing Sarven Wheels.—When I was a boy I thought I knew all about work and I cut out the rivets, but I learned later that it was boy's work and boy's talk, too. I have been repairing wheels for thirty-one years and have found that to cut the rivets is to injure the wheel. If you have tools you can cut out and drive in your spoke and the vacancy would not be as large as a gnat's eye. Of course if you only have an inch auger, a hand saw and a hatchet, as most have, to work with, you can't do it. I had to repair some wheels a while ago from which some man had taken the spokes and turned them back side in front so as to have the dish right.

After I had worked at my trade about two years I thought I was big Mike and a mechanic. I never had been away from home, but when I had been out a few years, I changed my mind. I did at one time all the fast shoeing in my parts of the country and then we had to make all the shoes; there was none to sell. When a man wanted a 6-ounce shoe he wanted it 6, not 8, and boys, if you had to do it now and make tangs on the side and in the center of the toe for weights you would find it something to do. I shod Buck Shot, a runner belonging to Dock Dansher of Wheeling, and made the shoes and nails. The hind shoes weighed three ounces and the front ones four ounces. The four shoes, full set, weighed 14 ounces and the nails were less than number 94. The heads were flat to the shoe. I got four dollars for that kind of work.

A. M. SPEER.

Some Kansas Prices.—I am one of the young smiths. I started in business for myself seven year ago by building a shop 24 by 40 feet. This is a small town of 250 inhabitants and supports another shop besides my own. I am getting my share of the trade and quote a few Kansas prices:

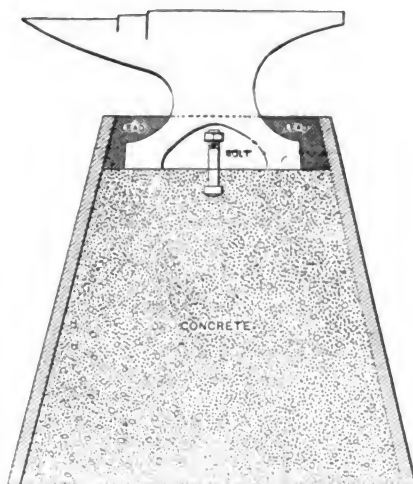
Wagon axles	\$3.50
" tongues	2.50
" hounds, each .....	.75
" bolsters, each	1.50
" felloes .....	.25
" spokes .....	.25
" wheels cut down per set	8.00
Buggy poles, each	2.50
" circles .....	.75
" shafts	1.25
Setting tires	2.00
Axle stubs, one inch	6.50
" " 1½ inch	7.00
" " 1¼ inch	8.00
Welding pole brace .....	.25
New plow lays	3.50
" lister lays	3.50
Pointing and sharpening plows .....	.80
Sharpening plows, 14 inch .....	.30
Plow handles, each .....	.50
Plow beams, wood	2.50
Lister subsoilers from	75c to 1.25
Pointing cultivator shovels, each .....	.50
Sharpening cultivator shovels, per set .....	.50
Stalk cutter knives, each .....	.20
Sharpening subsoilers .....	.10
Sharpening disc .....	.20 to .30
Welding mower sickles .....	.50
Welding mower pitman .....	.25c to .50
New shoes, each .....	.40
Old shoes	20c to .25

In conclusion let me say that no energetic and up-to-date blacksmith should be without THE AMERICAN BLACKSMITH. W. B. KASHA.

Improved Anvil Block.—There is nothing which makes a forge room so untidy in its

appearance as anvils carelessly placed on wooden blocks. Even those secured firmly to the blocks by means of straps of iron, bolts or staples, in time work loose, shift about and frequently fall off altogether. To hold the anvil firmly, to have it look neat and at the same time to make it as noiseless as possible when in use, has been a problem demanding much thought and experience.

As it is desired to use wrought-iron anvils in preference to cast iron, several experiments have been made. The result is that two blocks are now in use in the forge room; one is mounted with a Trenton and one with a Hay-Budden anvil, both being wrought-iron anvils. These are satisfactory in every respect, and the difficulty in holding the anvil secure is solved. All noise and vibrations when the anvil is struck are stopped, and its general appearance is very neat. The anvil is made fast to a mass of concrete, of broken stone and cement encased in a rectangular shaped box 18 inches high, made of cast iron ¾ of an inch thick, with a base 14 by 18 inches tapering up to 8 by 10 inches at the top, being 1 inch larger, inside measurement, than the base of the anvil. The anvil, as stated, rests upon the concrete 2 inches below the top of the casting. On each side (front and back) of the anvil, embedded in the concrete to a depth of about 3 inches, is a bolt and nut, the nut projecting up to nearly the top of the casting, and about 1 inch above the concrete. On the top of this concrete, melted lead is poured (filling up



AN IMPROVED ANVIL BLOCK.

this space between the base of the anvil and the top of the casting about 2 inches) which flows all around the anvil, the nut of the bolt, and into the corners of the casting. The taper of the casting together with the nut holds the lead to the cement, and this, it is evident, holds the anvil firmly.

Several methods have been thought of, such as having the anvil rest on a box of sand, mounted to wooden and concrete blocks by means of bands of iron, hook bolts, staples, etc. All these devices failed to give the result desired. It was found that by placing 1 inch or more of the base of the anvil in a tub of water, it lost its ringing sound, the vibrations ceased altogether, and the sound when struck with a hammer was dead, so to speak, as much so as the so-called noiseless anvils made of cast iron. The base of the anvil rests on the concrete, and is gripped by the lead. This arrangement stopped completely, just as the water did, all vibrations. The cost of this method of mounting anvils should exceed but little the cost of anvils mounted in the usual way.—A writer in *Machinery*.

Filling Sarven Wheels.—Having a good hub, draw the spokes. A good way is to

screw the spokes in the vise and take a block of wood with the ends sawed smooth. Place this against the flange and drive with a heavy hammer. Avoid chiseling the old ones out as much as possible. After I have my hub clean I take my bolt cutters and cut every other rivet. When this is done take the sharp edge of a wood rasp and cut a semi-circle on the flange the size of the rivets left in the wheel and large enough to hide half of the rivet and the spoke opposite the rivet. Fit eight spokes this way. Have the size spoke so as to fit exactly. Now you are ready to drive. See that your flanges have not sprung in any way by cutting the rivets. After the spokes are drawn you will have no punching to do to upset your flanges. Have good glue. Then drive the spokes around each rivet. They may not seem to close entirely up over the rivet, but if your impression is made right for the rivet when you drive your next two on the inside, you will succeed. When you drive the two in between, start both at the same time, driving one with one blow and the other with the next, until driven entirely up. This is done to let each spoke receive the same share of the rivets. When finished, drill the holes for the rivets. If your rivet and bit are a fraction larger than the hole in the flange it is that much better. Do not cut your rivet too long as it does not require the hammering that some think. I think filling Sarven wheels without cutting any of the rivets is a bad practice and also very injurious to vehicles. I don't care how long a man has worked in a wheel factory, I don't believe, he ever saw the rivets put in before the spokes.

T. R. FELTS.

Answers to Questions in the May Number.—

P. C. PRINGLE.—A flux for ordinary iron axles is plain white beach sand. For low or mild steel no better flux can be used than pulverized borax. For crucible cast steel, melt a sufficient quantity of lump borax on a clean iron plate just hot enough to melt the borax and cause it to form "brittles." When cold, pulverize it. Sprinkle the powder on the same as borax. This is known as "jewelers borax," "glass borax" and by other titles. If a small quantity of wrought iron or steel borings is first heated to a low red, cooled and mixed with the borax you have a ferruginated borate of soda which will do better than any other material. Borax is the base of all welding mixtures of the day.

POLZER BROS.—Use the same sand for brass castings as you do for iron. Sand which has been used a few times is best. Cores are made the same as for iron castings.

GEO. E. BRIERLY.—Draw the canvas on dry as tight as possible. Then size with a mixture composed of flour, water and a little glue. Use a two-pound round or a 4-inch flat brush in sizing. Before the sizing is dry give the whole a good stiff coat of priming, outside and inside, in which there is a good supply of white lead. (Use boiled oil). Let the first coat get good and hard before applying the second coat. Three coats is the usual number. Use no japan, but just enough varnish in the last coat to form a gloss to throw the water off.

P. C. PRINGLE.—Heat the file to a cherry red and lay it in sawdust—hard wood preferred. When cold grind out all the teeth. Make what you wish and temper in the usual way. File steel is not the best to make tools of.

T. V. BULCAN.

An Experience with an Unfair Smith.—In 1898 I moved to this town and after trying various occupations for a living, decided to enter the shop here, which was operated by a first class smith. We agreed upon terms for the first two years with the understanding that I put in one-half amount of capital and take half interest,

but at the end of the second year we had built up such a trade that he thought he would be foolish to give me half when he could hire a man my equal for less and as I would not work for wages, he backed. This was the first of April 1903. I had previously bought a lot and built a dwelling, so I put up a small shop, 18 by 24 feet and fitted it with what tools I could, commencing work by May 1st. With some help I did \$550 worth of work for that year. Last year with my brother, who was inexperienced, we went a little over \$1,200, besides adding one 20 by 36-foot room to the shop. I do some of nearly every kind of work known to the general repair shop. We have all sorts of characters in horses and mules—kickers, interferers, over-reachers, wild and gentle and have to shoe at the small sum of 65 cents, never using anything but a plain finished shoe. I have had very good success in shoeing horses that interfere and it has added to advertising my business as much as any other thing. I recently made myself an axle gauge from a description I noticed some time ago in THE AMERICAN BLACKSMITH, also an axle setter to use without taking the axle off. I find both to be excellent and would not part with them. As soon as I am able, I expect to put in power and a good deal of machinery.

Some of our prices are as follows:

Setting wagon tires	\$.50 to \$.75
“ buggy ” .....	.50
Welding on short beds for buggy	5.00
Welding broken buggy axles .....	.75 to 1.00
Welding broken wagon axles	1.00 to 1.50
Putting on new buggy body	8.00
Painting buggy	5.00 and up
One new wooden axle	2.50
One new rocking bolster	1.50
One pair front hounds	3.00
One pair back hounds	1.25
New set buggy tires	4.00 up
Wagon tongue	1.50
Shoeing .....	.65
Resetting shoes .....	.40

J. M. BLANCHARD.

A Talk on Shoeing.—I see in the February number C. D. Briddell's ideas on interfering and I agree with him almost to the letter. Some think it is all in the shoe, but I think it more or nearly all in the dressing of the foot, but when you have no foot then your only chance is to make it up on the shoe. Don't pare the foot to make it look nice, but pare it to keep the horse from interfering. File as little of the outside as possible. Take it off the bottom and if you have no tool to cut it off with, buy a peeler rasp at once. In shoeing flat feet I have had considerable experience and good luck. You can cut much of the bottom, but you must set the shoe back and cut off the toes; if you don't they will get too long and turn up and the horse will not be able to walk good. I have set them back until I thought it too far, but the farther back the better the job. I think that you should not bevel the shoe too much, but should give them a little pressure on the sole; if you don't the shell will be too light and flat. It will not stand the weight and will turn up and cause lameness. I had one once that was flat. The man who had shod the animal could not pare the bottom to suit himself and could not bevel the shoe enough so he took a piece of $\frac{1}{4}$ -inch square stock and fastened it to the shoe on the bottom so as to rest on the shell. It pressed the shell up so as to almost divide it from the other part of the foot and the horse walked lame so that it was almost impossible to shoe it. You can give them some sole pressure if you are careful not to give them too much. When they go without shoes they walk more or less on the sole.

but don't forget to set the shoe back and cut off the toe. It's the only method for a flat foot, as they are diseased and grow wrong. A horse that is ringboned will travel better in front, so make short calks or none, and put a toe on the shoe. They step on the heel. But some do it just the reverse and the horse does not do well.

About repairing Sarven wheels; I get tired of hearing the boys and self-made mechanics talk about cutting out rivets. When they leave the trade or have experience enough to learn, they will quit cutting out rivets. I agree with H. K. Van Tyne & Son and J. C. Van Stavern. I have never seen any jobs in which the rivets were cut out that gave satisfaction and I have fixed many without removing the rivets. With repairing wheels and shoeing horses I have had good success. I worked several years for race horse people when the shoes all had to be made by hand.

A. M. SPEER.

Random Remarks on the April Issue. On the first page the editor, under the caption “A Spirit to be Cultivated,” discourses on the spirit of benevolence shown by some craftsmen who take delight in teaching others what they have learned. This reminds me of an old man who at one time worked for me. When he started to work he said, “When you see me doing any job, and you know a better way of doing it, I want you to show me your way. I will do the same by you if you want me to, and perhaps we can both learn something.” He had been working at the trade forty-four years, had traveled all over the West and Mexico and was still learning. It is needless to say that I learned many things from him. It is the privilege, or let me say the duty, of every reader of this paper to follow this spirit of helpfulness. You can do it by sending to the editor your way of doing any and every kind of work that you know how to do well.

Page 129. Mr. Woodside gives good advice about buying and working tool steel. Now some brother who has had experience should tell us more about the proper handling of the new high speed steels that are taking the place of the ordinary tool steel in machine shops.

Page 129. The photograph of “A general blacksmith shop in Nebraska” tells us more about the management of the shop than a page of description. The prices for work, taken in connection with those given by the Missouri Association on page 131 are very interesting. The Nebras-

when you want it to keep still—and there are not many friends who know enough for that. A library is a collection of friends.”

I am glad to know that our editor who believes in co-operation and organization among members of the craft, has not gone light headed over the matter, as some labor leaders have. He gives this sound advice: “Work as much overtime as may be necessary and do your resting after the rush is over.” This does not sound like the kind of advice that some workmen get from their union leaders. I know a carpenter who was disciplined by his union for unlocking his chest and taking out his overalls and tools before the 8 o'clock whistle blew. Don't be afraid to co-operate with your neighbors for mutual helpfulness, deciding upon uniform pay for work, etc., but when any man tries to dictate to you, as to just how many hours you should work, let him know that you are the one to decide such questions.

Page 136. Did you read the article on shoeing by E. W. Perrin? If not, turn back to it now. It is like all of his articles, well worth reading. Notice the plain drawings. Take a good look at Fig. 2. It will help you to remember how easy it is to get the nails too near the sensitive parts if you are ever tempted to trim the hoof as the author tells you not to.

Page 138. J. F. Schurle has trouble with borrowers. “Your lot is the common lot of all,” Mr. S. The borrower, like the poor, “are always with us.” Mr. Schurle says he does not like to refuse certain parties. He wants to be neighborly and accommodating, and still he would like to have his tools to use when he needs them. We had exactly the same experience in our shop. Everybody in the place seemed to think that the blacksmith shop was maintained for the accommodation of everyone who wanted to borrow a tool and did not care to return it. We finally hit upon a plan which has been in operation for four or five years and which works very well. We got the printer to print several hundred blanks like the one here shown. No tool is allowed to leave the shop without a slip being filled out and signed, showing who borrowed it, its value and when it is to be returned.

Page 138. John Padberg asks how long to cut $\frac{1}{4}$ -inch stock to make rings five inches outside diameter. The answer to his question by W. B. would be correct if the diameter were to be measured from center to center of stock instead of outside. When hot iron is bent it stretches on the outside of the bend about as much as it pushes

SCHOOL OF AGRICULTURE. University of Minnesota.

Date.....Time.....

This is to Certify That I have borrowed from the School Blacksmith Shop

valued at..... I hereby promise to return the same, in good order, before.....or pay the full value mentioned above.

Signed.....

kan's price of \$1.25 for sharpening lays must be a misprint. But why should horseshoeing (practicularly new shoes) cost so much more in Missouri.

Page 130. The remark about “Good books making good companions” brings to mind the following quotation from Lyman Abbott: “A book is a friend; a good book is a good friend. It will talk to you when you want it to talk and it will keep still

together on the inside, so that the rule of multiplying the diameter of the circle by 3.1416 will give the diameter of the resulting ring made of any length of iron if said diameter is measured across from center to center of stock. For an outside diameter of five inches in the case of 3-8 inch stock the real diameter, measured as above, would be $4\frac{1}{2}$ inches, and $4\frac{1}{2}$ times 3.1416 is 14.52+.” J. M. DREW.

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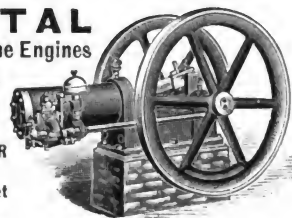
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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., May 27, 1906, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.			
$\frac{1}{2}$ in., round or square; Iron, \$2.80; Steel, \$2.90			
$\frac{3}{4}$ in., " " " " 2.40 " 2.50			
$\frac{1}{2}$ in., " " " " 2.20 " 2.30			

Flats—Bar and Band.			
$\frac{1}{2}$ x 1 in., Iron, \$2.80; Steel, \$2.90			
$\frac{1}{2}$ x 1 $\frac{1}{2}$ in., " 2.20; " 2.30			
$\frac{1}{2}$ x 1 $\frac{1}{2}$ in., " 2.40; " 2.40			

Norway and Swedish Iron.			
$\frac{1}{2}$ in., round or square, \$4.90			
$\frac{3}{4}$ in., " " 4.50			
$\frac{1}{2}$ in., " " 4.80			
$\frac{1}{2}$ x 1 in., " 4.80			
$\frac{1}{2}$ x 1 $\frac{1}{2}$ in., " 4.20			

Horseshoe Iron.			
For No. 1 shoe, $\frac{3}{4}$ x $\frac{1}{2}$ in., \$2.50			
For No. 2 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.50			
For No. 3 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.50			
For No. 4 shoe, $\frac{3}{4}$ x $\frac{3}{4}$ in., 2.50			

Toe Calk Steel.			
$\frac{1}{2}$ x $\frac{3}{4}$ in. and larger, \$8.00			

Spring Steel.			
$\frac{3}{4}$ to 1 $\frac{1}{2}$ in. Rounds, Op. Hearth \$3.00, Crucible \$5.00			
1 $\frac{1}{2}$ to 6 in. by No. 4			
gauge to $\frac{1}{2}$ in. Flats " 8.00, " 5.00			

Carriage Bolts. (Net Price per Hundred).			
$\frac{1}{2}$ x 2 in., \$0.54	$\frac{3}{4}$ x 2 $\frac{1}{2}$ in., \$0.82		
$\frac{1}{2}$ x 2 $\frac{1}{2}$ in., .58	$\frac{3}{4}$ x 3 in., .96		
$\frac{1}{2}$ x 3 in., .62	$\frac{3}{4}$ x 6 in., 1.31		
$\frac{1}{2}$ x 4 in., .65	$\frac{3}{4}$ x 8 in., 1.70		
$\frac{1}{2}$ x 8 in., .75	$\frac{3}{4}$ x 8 in., 2.10		

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

PADDOCK-HAWLEY IRON CO.
Iron, Steel, Carriage and Heavy Hardware,
Trimnings and Wood Material. . . .
ST. LOUIS, MO.

CAMPBELL IRON CO.,
ST. LOUIS, MO.

Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.

WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write us your requirements.

THE
Williams Hardware Co.
Minneapolis, Minn.

Wholesale IRON, STEEL and
HEAVY HARDWARE.

CARRIAGE AND WAGON
WOODSTOCK.

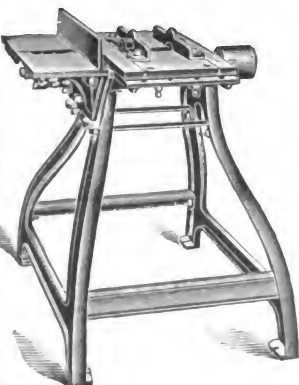
HORSESHOERS' SUPPLIES.

Send us a Sample Order.

BICKNELL'S
POLE
ROUNDER

made with 4 in. rounding head and 4 in. jointer head. Write for catalogue of tools and machinery.

BICKNELL
MFG. &
SUPPLY CO.
Janesville, Wis



WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

FOR SALE.—General blacksmith shop, tools and dwelling, in town of 25,000 people. For further information address

L. O. DODGE, Norwich Town, Conn.

A LOST ART FOUND.—Copper tempered. For 75 cents I will send you choice of small horse shoe with copper calks welded to steel shoe, an axe with steel head and copper blade or copper trowel with steel handle. C. R. CASH, Hudson, O.

FOR SALE.—Wood department of wagon shop. Town 10,000 population. Only shop in town (connects with smith and paint shop). Reason for selling, loss of sight. Tools and stock \$550. Shop rent \$7.50. Address B. F. MINNICK, Clearfield, Pa.

FOR SALE.—Desirable blacksmith, horseshoeing and wheelwright shop, tools and business. Situated on main boulevard at Rockaway Beach, L. I. Three story building 25 feet by 55 feet. Large yard. Desire to sell on account of age of owner. For full particulars write or call on

G. R. HENDRICKSON,
11 Ruland Pl., Rockaway Beach, L. I.

BLACKSMITHS, be master mechanics and get well jobs by using Toy's New Treatise on Steel Work, with 75 modern methods on forging and welding all difficult jobs, with valuable welding compounds for same, and hardening and tempering all tools to a standard with Toy's colored tool tempering charts. All the above for one dollar. Send for valuable samples free. W. M. TOY, Sidney, O.

WANTED.—A man in your town to manufacture hollow concrete building blocks, all sizes, plain and rock faced, for yourself and public; costs one-third the price of brick and much better; very profitable. Splendid opportunity for very small investment. Write for proposition and prices on machines.

HOOSIER CONCRETE BLOCK MACHINE CO.
Station A, Indianapolis, Ind.

MY FREE BOOK

Is called "How Money Grows" and tells: How to tell a good investment; how to invest small sums; how you can convert \$100 into \$1000; how to guard against poor investments, etc., etc. If you are able to save \$10 or more a month from your income you should not fail to own a copy. NOT AN ADVERTISEMENT of any investment but full to the brim with information that everyone should possess before they invest a dollar. Ask for it on a postal and I'll send it FREE by return mail. W. M. OSTRANDER, 109 North American Bldg., Philada.

Trade, Literature and Notes.

A VERY ATTRACTIVE booklet and price list of Poldi Tool Steels recently issued by Peter A. Frasse & Co., 92 Fulton St., New York City, gives considerable useful information about this steel, with directions for working the same. This catalogue will be sent free of charge to any address.

A RECENT CIRCULAR from the Kneeland Mfg. Co., of Lansing, Mich., is made up of testimonials received from users of their engines.

Perhaps no encouragement is greater to a firm than letters of testimony and the Kneeland Mfg. Co. is unusually fortunate in this respect.

UNUSUALLY STRIKING AND HANDSOME is the mailing card just issued by the Buffalo Forge Company, showing the various types of disc wheels which they make for cooling the air in hot offices, engine and boiler rooms, for removing smoke from blacksmith shops, etc. The card is a work of art, and will be sent free of charge to any address.

AN INTERESTING CIRCULAR describing the new building block machine manufactured by the Hoosier Concrete Block Machine Co. of Indianapolis, Ind., will be sent to any smith upon application. Three half-tones showing the many special features of the Hoosier machine make the leaflet well worth a letter of request.

"BRIGHTON" AND "NEW STANDARD" horse nails, say the Standard Horse Nail Co. of New Brighton, Pa., have won their reputation solely upon merit and they claim that these two brands are the best driving and best holding nails ever produced. On page XXXVI are given dealers' net prices to shoers.

TWO LIVE HEADS drawing the tire in both directions at the same time is one of the features of the Mayers Cold Tire Setter. This method makes it easy to get uniform dish and marks quite an improvement in the manufacture of tire setters. For further description see the advertisement of the Henry Mayers Machinery Co., on page XI.

AMONG OUR NEW ADVERTISERS is the Firestone Tire & Rubber Co. of Akron, Ohio. In their advertisement on page XX, they state that many years of experience are represented in the manufacture of side-wire tires. Surely the "Firestone" brand has a broad reputation and the popularity of these tires speaks strongly of their quality.

HYDRAULIC POWER has been applied to a side grip tire setter to good advantage by the Standard Tire Setter Co. of Keokuk, Iowa. The new machine is enjoying much popularity. Special

privileges are given to first purchasers in districts, and blacksmiths who are considering the purchase of an improved scientific tire setter will do well to correspond with the above mentioned concern.

CAPITAL GAS AND GASOLINE ENGINES are fully described and illustrated in the new thirty-two page catalogue of the Capital Gas Engine Co. The book contains many beautiful halftones showing the different working parts of the engines. A copy of the catalogue will be sent upon request to any smith interested in Capital Engines.

THE AUTOMOBILE AND WAGON JACK herewith illustrated has a double hoist, capable of lifting clear from the ground with perfect ease, and can be quickly adjusted to most any height of axle. This jack is manufactured by the Batavia Clamp Co. of Batavia, N. Y., who will be glad to send price list and complete catalogue to any smith who may be interested.

STRIKE NOTICE No. 1, an announcement received recently from Kelly, Maus & Co. of Chicago, states that the present teamsters' strike will in no way affect the delivery of goods by this concern. They load direct into cars on a private side track, or on boats at their own dock for convenient delivery to all railroad and steamboat lines.

THE U. S. BRAZING COMPOUND CO. of New Bedford, Mass. claim that with "Brazil" any smith can successfully braze broken castings and they want every smith to give their compound a fair test. In their advertisement on page VII they offer to send prepaid a complete sample working set for \$1.00. Judging from the many testimonials this company has received from smiths who have tried "Brazil" it would seem that the repairing of broken castings should be quite a profitable side line.

AN EFFICIENT WIRE DRAWING MACHINE is being manufactured by The Goodyear Tire & Rubber Co. of Akron, Ohio. The dimensions of this machine are 15 feet long, 8 $\frac{1}{2}$ inches wide and 4 inches deep and can be used for tires from $\frac{1}{2}$ to 2 inches in size. One of its features is that it not only draws old wires out of solid rubber carriage tires, but draws in new ones at the same time. A machine of this kind is very valuable to the repair shop, and should pay for itself in a comparatively short time.

THE WEST TIRE SETTER CO. of Rochester, N. Y., advise us that they have made several experiments in setting tires by both the hot and cold methods. Tires set cold have been put on one side of a wagon and hot set tires on the other, and as a result they find that with the former method the tires generally last longer. They claim that with the West Hydraulic Tire Setter the work can be done quickly, without marring the wheel, burning the rim or necessitating the removal of bolts from the tire.

AROUSED BY CERTAIN CLAIMS made by F. R. Phillips & Sons Co. of Philadelphia for Laffitte Patent Welding Plates, we made a test in our experimental shop last month and reported the result as most satisfactory in our May issue. These plates are a recent French invention and are being handled in this country by the above named firm, who are now making arrangements with all first class dealers to handle their product. We believe that these welding plates will enjoy a large sale in the States, for they are a great help to the smith, when attempting difficult welds.

A FAIR OFFER is made by The Acme Hardware Co. of Newark, N. J., to AMERICAN BLACKSMITH readers who purchase their Victor Adjustable Alligator Wrench. They offer to forward same upon receipt of price, \$1.00, which will be refunded after a thirty-day trial test if the wrench does not prove entirely satisfactory.

The wrench has an interchangeable movable jaw, can be used as monkey wrench, a plyer or pipe wrench. It is a very handy tool, and in view of the guarantee made for its strength, efficiency and quality should be a valuable addition to your shop equipment.

"IT SAVES LABOR, TIME AND FUEL," say the Henion Tire Heater Co. of Newark, New York, in speaking of their new portable tire heater. We have received an interesting four-page circular giving a full description of this heater and judging from several testimonials from smiths who have purchased them, it appears to be a very practical device.

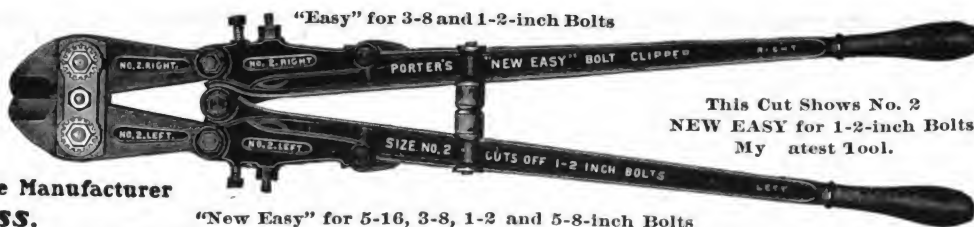
The description says the tire is suspended on a carrying roller in the upper part of the heater, in such a manner so as to bring the lower part of the tire very near to the fire in the forge. A small wheel with handle extending from the upper left hand side of the device, is used for turning the tire on the roller and in this way the heat is evenly distributed. Inside and outside of the tire are curved heat-deflecting plates to keep the heat as near the surface of the tire as possible while passing through the heater. It is claimed that in this way an ordinary tire can be heated in about six or seven minutes with a cost of coal not exceeding two cents.

A descriptive leaflet illustrating the heater in operation will be sent to any smith upon request.



PORTER'S —THE BEST— BOLT CLIPPERS

H. K. PORTER, Sole Manufacturer
EVERETT, MASS.



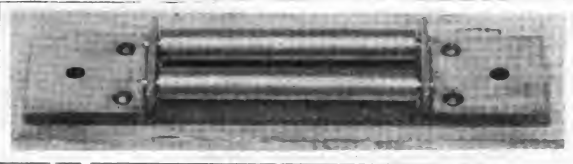
This Cut Shows No. 2
NEW EASY for 1-2-inch Bolts
My atest Tool.

"New Easy" for 5-16, 3-8, 1-2 and 5-8-inch Bolts

2 RIVETS and 1 HAMMER

are all you need to fasten our Roller Reach Irons on any farm wagon. Make the wagon turn easily, because you don't have to grease the sway-bar.

20 Cents Each.
10 or 25 in Box.



W. T. DAUM & BRO.,
AUSTIN STATION, CHICAGO.

We make the following sizes:

No. 1, 3 in. wide, 14 in. high
" 2, 3 1/2 " 14 "
" 3, 3 1/2 " 10 "

Price, \$1.65 per set of 4 stks
Cash with order. Weight, 16 lbs.
per set.



This shows the
strength of our
STANDARD
compared to
the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 x 2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.

LOTS AND LOTS OF BLACKSMITHS

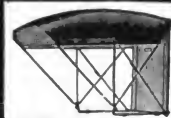
have sent us in one or more new subscribers to the paper. **HAVE YOU?** If not, why not secure one new subscriber to THE AMERICAN BLACKSMITH during June, and let us extend your subscription six months as a reward? What do you say?

AMERICAN BLACKSMITH COMPANY,
BUFFALO, N. Y.

A COMPLETE LINE OF Carriage Tops

and Trimmings

Seventeen different grades of tops
All good ones.
Prices right.



Ask for No. 5 Catalogue

C. A. HALLIDAY, 24 Cedar St.
Oneida, N. Y.

Fac-Simile Letters

FOR
Circularizing and Follow Up Systems

Look like the original
and bring results. Fur-
nished complete with
names filled in or ribbons
to match.

LERNER - BEAN CO.,
363 Washington St., BUFFALO, N. Y.

RICH'S NEW

ARTISTIC
HORSESHOEING



MY LATEST BOOK

ARTISTIC HORSESHOEING

SHOULD BE IN EVERY UP-TO-DATE SHOP.

THE PROGRESSIVE SMITH

will find it invaluable in his every day work. A practical, scientific treatise on improved methods of shoeing. Special directions given for correcting faulty action in trotters and for shaping shoes to cure different foot diseases. 284 different styles of shoes illustrated and explained. Cloth bound, 217 pages, Price \$2.00.

—AGENTS WANTED.—

Prof. GEORGE E. RICH, 239 S. Main St., AKRON, OHIO.

A FEW OF OUR SPECIALTIES

THE GOGEL BLOW PIPES
THE GOGEL FIFTH WHEELS
OUR NEW FLARE BOARD IRONS

Will braze your rubber tire wires quicker and better than any other apparatus known to the trade. Strong, durable, safe and reliable flame, always under operator's control. Saves time and money.

Will outwear the best two any smith can forge and do not cost one quarter as much. They need no hole through axle to put on. Easily fitted. You don't need a high arched ft. axle to get level reach.

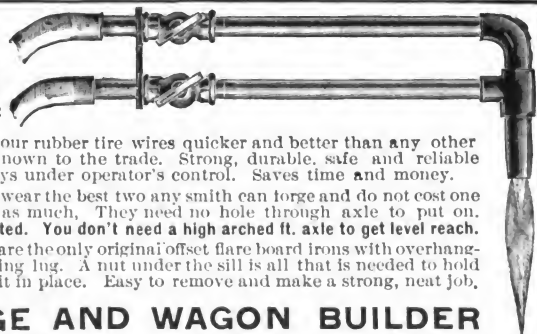
are the only original offset flare board irons with overhanging lug. A nut under the sill is all that is needed to hold it in place. Easy to remove and make a strong, neat job.

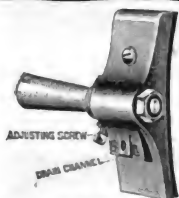
EVERY CARRIAGE AND WAGON BUILDER

Is invited to write for our New Interesting Circular. Sent free to any address upon request.

—THE—
GOGEL MFG. CO.

234-238 S. Erie Street,
TOLEDO, OHIO.





Potters Spring Brake Blocks

For Vehicles of all kinds with **STEEL OR RUBBER TIRE.**
Have a record of excellency for seventeen years. 

The MORGAN POTTER CO.

SOLE MANUFACTURERS.

CATALOGUES.

FISHKILL ON HUDSON, N. Y.



Across
Lake Erie
Between
Twilight
and
Dawn

THE D. & B. Line Steamers Leave Detroit daily at 5:00 p. m. (central time) and Buffalo daily at 5:30 p. m. (eastern time), reaching their destination the next morning after a cool, comfortable night's rest en route. By special arrangement all classes of tickets reading via the Michigan Central, Wabash and Grand Trunk Railways, between Detroit and Buffalo, in either direction, are optional and will be accepted for transportation on the D. & B. Line.

**Detroit & Buffalo
Steamboat Co.**

A. A. SCHANTZ,
Gen'l Supt. & Pass. Traf. Mgr.
Detroit, Mich.



Wolfe's Cold Tire Setter

Patented

The most complete machine
for the purpose on the market

Simple in construction, easily operated.
Quick adjustments, prompt results.
Takes a short hold or long one, as desired.
Grips the tire firmly, keeps it always in line.
Double acting, quick for light tire, powerful for heavy.
Dishing device with every machine.
No cold tire setter a success without it.
DO NOT BUY without investigating this.
The latest and best. Write for particulars.

HENDRICKS MFG. CO.

Manufacturers and Selling Agents, Wanesboro, Pa.

Less Work and More Money

A GUARANTEE MADE TO USERS OF

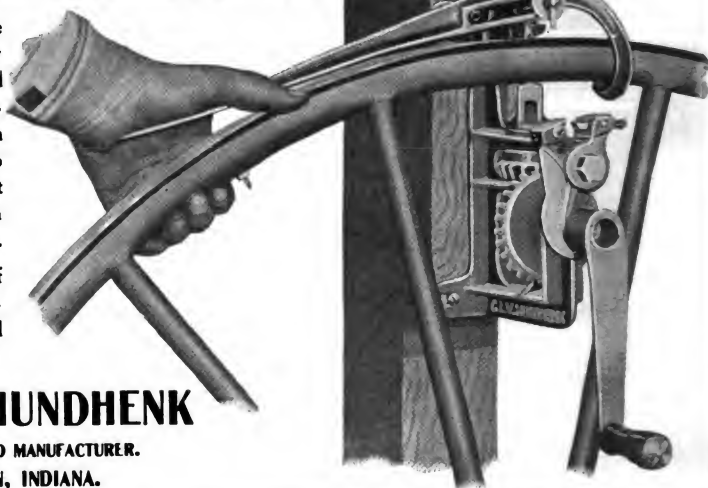
The Mundhenk Tire Bolting Machine

Mundhenk's Tire Bolter is the Only Machine that Will Successfully Remove all Burrs, Run Them On or Clip Ends off Tire Bolt Perfectly Smooth in 2 minutes' time.

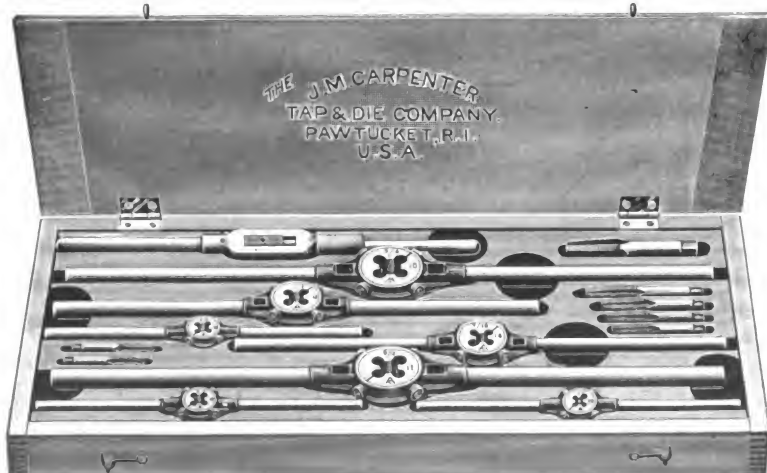
Send for one of our interesting circulars and let us tell you all about it.

C. L. V. MUNDHENK

INVENTOR AND MANUFACTURER.
MARION, INDIANA.



Easily operated. Made of Malleable Iron. Constructed to fit any size nut. A labor saving machine for up-to-date shops.



CARPENTER'S NEW FULL MOUNTED DIE SETS

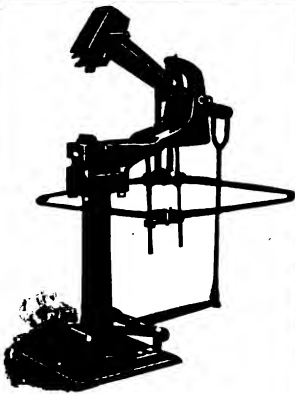
With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

Send for catalogue

The J. M. Carpenter Tap & Die Co.

Pawtucket, R. I., U. S. A.



FOOT POWER HAMMER

A FOOT POWER HAMMER

The most convenient machine a smith could buy. Carefully constructed, easy to operate. Strong, Powerful, Durable. Requires no engine to run it.

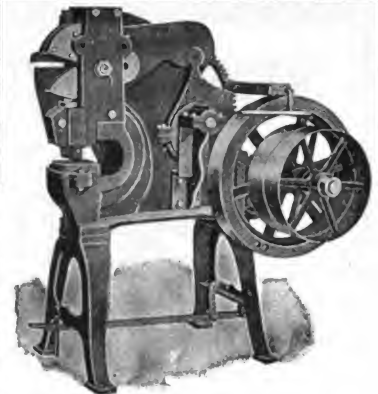
Does a Wide Range of Work. Leaves Both Hands Free.

WE ALSO MAKE A SPECIALTY OF
BLACKSMITHS' PUNCHES

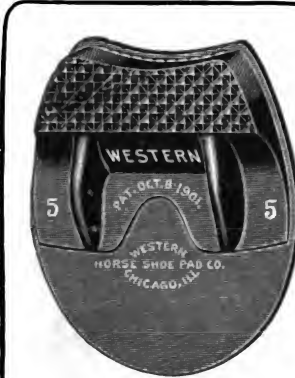
It will pay you to write for our Bulletins.

THE C. E. SUTTON COMPANY

TOLEDO, OHIO, U. S. A.



BLACKSMITH PUNCH



Do You Use Western Pads? If Not, Why Not?

Did you ever stop to consider what the name "Western" means in connection with "Pads"? If you have not, we want to say right here, Mr. Horseshoer, that "Western" stands for "Quality, Design and Freedom from Freak Ideas."

Use Western Pads and be up to date

First Rubber Company

Sole Manufacturers
156-158 Lake Street Chicago, U. S. A.



PEERLESS MILK WAGON (Short turn)
FORSBURG SPRING AND GEAR CO., ROME, N. Y.

Write for
Catalog
and
prices
on
full
line
of gears.



Lathes and Drill Presses

Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

Catalogue M.

SHEPARD LATHE CO., 132 W. 2d St., Cincinnati, O.

BROWN'S

HEAVY BOWS OUR SPECIALTY

ANY SIZE
WIDTH
HEIGHT

SEND FOR CATALOGUE
GIVING DESCRIPTION OF OUR FULL LINE

S. N. BROWN & CO., DAYTON, OHIO.

New Era Electric BLOWER

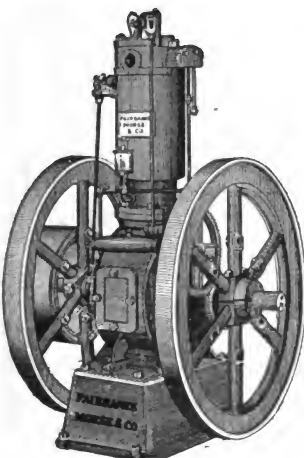
Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.



Write for circular and particulars.

942
W. Lake St.
CHICAGO.



It is not necessary to enumerate all the advantages of the

Fairbanks-Morse Gas, Gasoline and Oil Engines

The Grand Prize and Four Gold Medals at the World's Fair, 1904, and over 400,000 H. P. in use, tell a story that cannot fail to bring your inquiry if you want the best power plant.

Cut out complete advertisement and send to
FAIRBANKS, MORSE & CO., Monroe St., Chicago, Ill.

Please send me illustrated Catalogue No. EV 487
Gasoline Engines. I may want..... H. P.

Engine to run.....
Name..... Street No.....
Town..... State.....

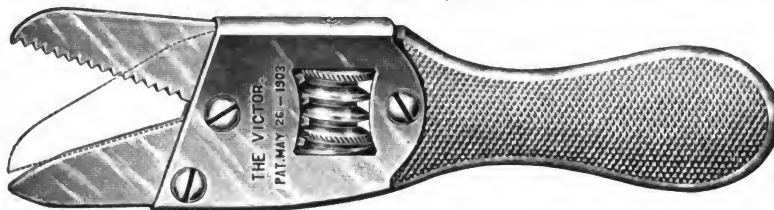
TIME SAVED IS MONEY IN YOUR POCKET

THE VICTOR

ADJUSTABLE ALLIGATOR WRENCH

PATENTED MAY 26, 1903.

**Drop Forged
of Best
Tool Steel**



**MOVABLE
JAW**

IS A TIME AND MONEY SAVER

By passing the thumb over the screw it may be adjusted five-times faster than any other wrench. It will take the place of a monkey wrench. May be used as a pleyer—will do the work of a pipe wrench.

Combines strength, simplicity and rapidity of adjustment. No springs to break. Cannot get out of order. Every part visible.

Perfectly hardened and tempered. Absolutely guaranteed.

All objections to alligator wrenches overcome.

A high grade tool for plumbers, gas and steam fitters, wagon smiths, machinists and mechanics of all kinds.

The movable jaw, which is of the best steel, IS INTERCHANGEABLE, and may be replaced easily in case of wear or breakage.

Made in three sizes, full nickel plated,

7 in.	8 in.	10 in.
\$1.00	\$1.25	\$1.50

The 7 in. size is also made in dull black finish with polished jaws.

Extra Movable Jaws	7 in. .25	8 in. .35	10 in. .50 each.
--------------------	--------------	--------------	---------------------

OUR 30 DAYS' FREE TRIAL OFFER

If your dealer does not handle the Victor Adjustable Alligator Wrench, we will send prepaid a 7 in. full nickel or black finish Victor Adjustable Alligator Wrench for

\$1.00

Test it 30 days. If not fully satisfied return it and get your money back.

Write for our special offer for club orders of 6 or 12 wrenches

ACME HARDWARE CO.

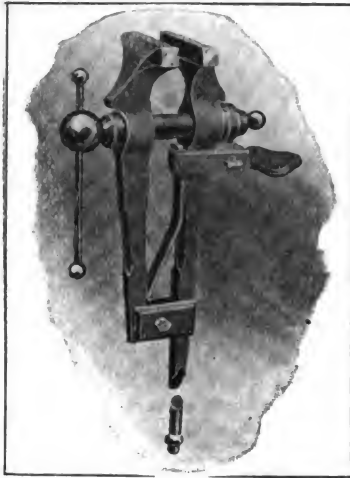
MANUFACTURERS OF HIGH GRADE TOOLS

35 LITTLETON AVENUE, NEWARK, N. J., U. S. A.

Columbian Hardware Co.

CLEVELAND, OHIO.

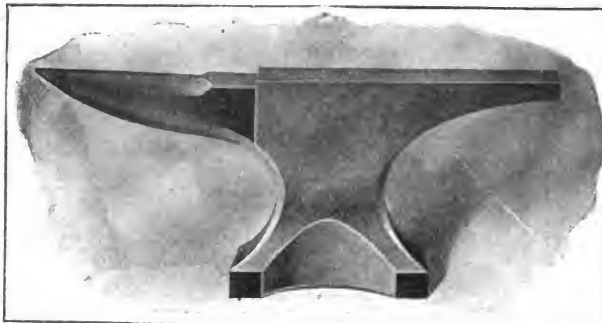
OUR ANVILS
are made of special
ingot steel. Each
one is protected by
our written guar-
antee. Built to
stand the test of
long, severe ser-
vice. Carefully
constructed by the
most skilled work-
men. Their
quality cannot be
excelled.



OUR VISES
have jaws forged
from one piece of
special ingot steel
and faced with
high-grade cruci-
ble tool steel. Our
horseshoers' vises
are made to
turn both calks
at one heat on flat
front jaw. Every
vise carefully in-
spected before
leaving factory.

COLUMBIAN ALL-STEEL ANVILS AND SOLID-BOX WROUGHT STEEL VISES
Are noted for their superior quality. Only first-class material
and workmanship employed in their construction.

SEND
FOR
CATALOGUE



WRITE
FOR
PRICES

COLUMBIAN HARDWARE CO.,
CLEVELAND, OHIO.

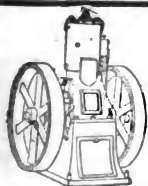


HELLERS' CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.

SCOTCH PATENT DRIVING HAMMER.

HELLER BROTHERS CO., Newark, N. J., U. S. A.



KEROSENE ENGINES

Safe, Sure, Simple, Reliable and Efficient. Most Economical Power in the World. Especially Adapted for Shops Using Small Power. Cheaper and Safer than Gasoline. No Sparker. No Igniter.

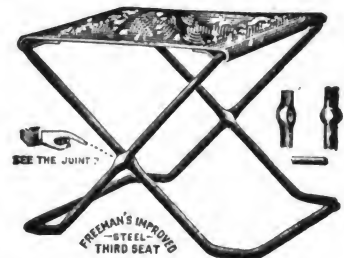
WRITE FOR DESCRIPTIVE CIRCULAR AND PRICES.

WHITEHALL ELECTRIC CO., 32 Park Place, N. Y.

THE WHEEL OF TIME
for all time is the...
Metal Wheel

We make them in all sizes and varieties. **TO FIT ANY AXLE.** Any height, any width of tire you may want. Our wheels are either direct or stagger spoke. Can **FIT YOUR WAGON,** Perfectly without change....
NO BREAKING DOWN
no drying out, no resetting tires
CHEAP because they endure
Send for catalogue and prices.
Electric Wheel Co.
P. O. Box A Quincy, Ills.

FREEMAN'S Improved Steel Third Seat



Superior to all other third seats on the market. The frames are made of polished steel bars finished in black enamel. The joint is upset to double the size of the bar, which gives great additional strength and allows the use of a steel pin twice the length used in other steel seats. It is impossible for the joint to give out or the pin to break. See the cut. It can be used as a carriage third seat, camp chair, hassock or child's chair.

In order that you may satisfy yourself of the superior quality and genuine merit of the Freeman Folding Third Seat, we will be pleased to send you one sample seat by express, prepaid, upon receipt of 75c. in coin or stamps. At the same time, we will quote you our best dealers' price in quantities.

Geo. B. Freeman Mfg. Co.

93-97 14th Street,

RACINE,

WIS.

High Pressure Brand No. 2 Brazing Forge



Patented February 7, 1900.

Will do all kinds of brazing, both light and heavy. It is fitted with three powerful improved Hydro Carbon Burners. Both Gasoline and Kerosene Machines in stock. Write for description.

The National Cement and Rubber Mfg. Co.,
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Alaska Welding Coal is put through a chemical process, which gives it the greatest welding qualities of any coal ever put on the market, and once you use it you will never be without it. It is the cheapest and best coal ever used by a blacksmith. One sack of Alaska Welding Coal, mixed with any poor quality of Blacksmith's coal, will do more and better work than any compound known to the trade. You can weld all kinds of high steel, with perfect ease. It welds iron or steel to malleable castings. It will weld pieces of malleable casting as firmly as if they were never broken. You can weld spring steel as easily as two pieces of iron. It toughens poor, brittle iron; your fire never gets dirty, and is fit for welding at any time. We particularly recommend the use of Alaska Welding for heavy welding, in fact all work in a blacksmith's shop down to the shoeing of horses. It does away with the using of all welding compounds, and is the most economical fuel on the market. Buy coal of a cheaper grade and mix with the Alaska Welding Coal. It will go farther and do more work than any other coal now in use. Why pay six and a half to seven and a half (\$6.50 to \$7.50) dollars for coal when Alaska Welding Coal does more and costs less. Save time and labor and money by using it. It makes the purest and cleanest fire, requiring little attention. Two handfuls sprinkled over your fire will be sufficient to do the most difficult welding job that comes into your shop.

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are built entirely of steel and are noted for their durability. They are thoroughly reinforced and braced; practically indestructible, light, compact, rigid and smooth running.

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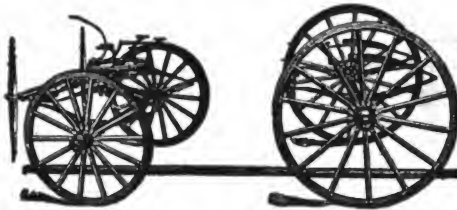
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Pipe Reamers same price.



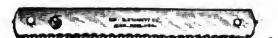
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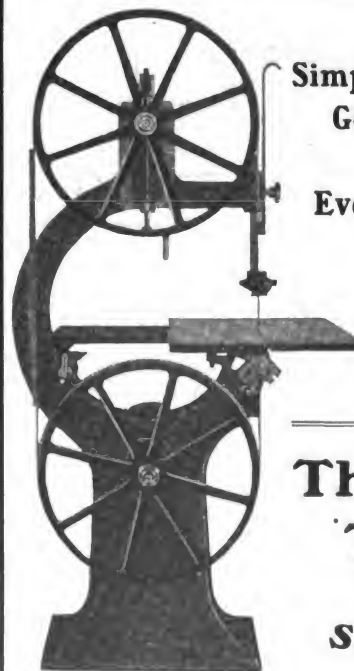
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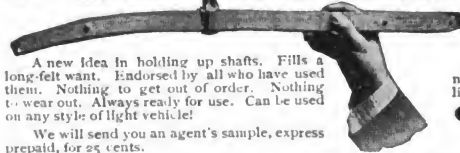
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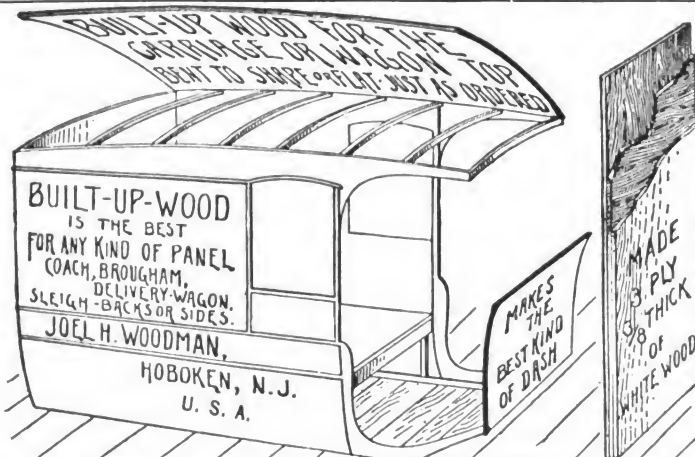
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We ship same guaranteed to give sat-
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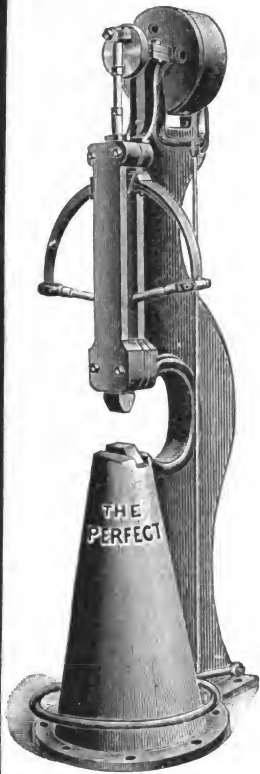
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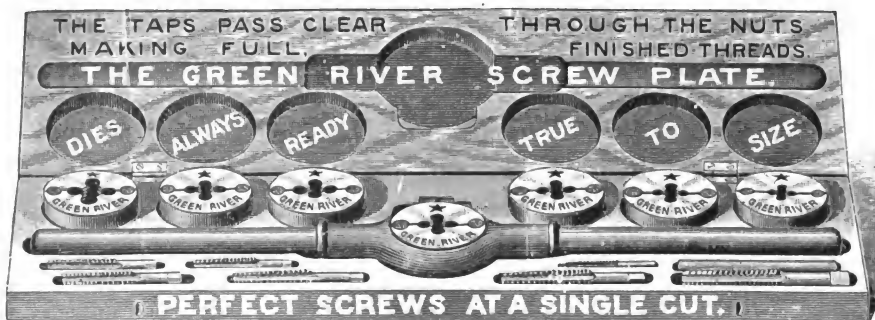
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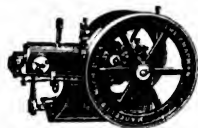
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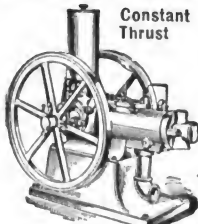
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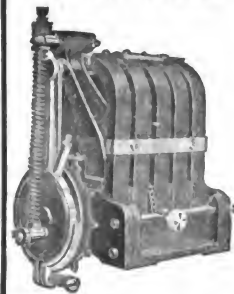
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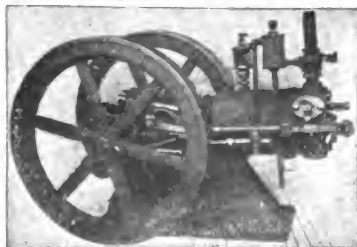
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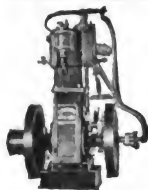
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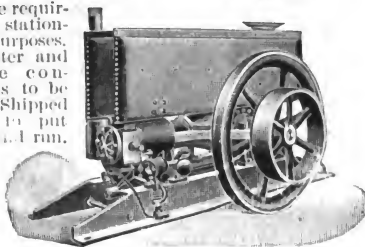
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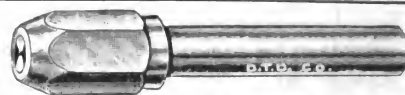
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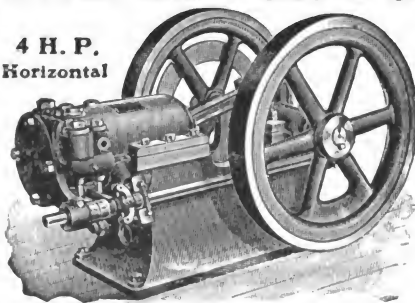


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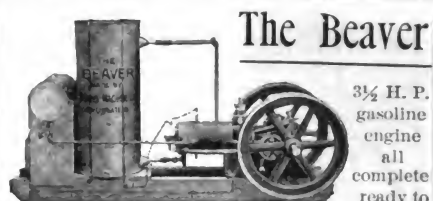
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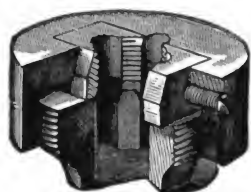
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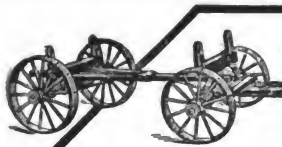
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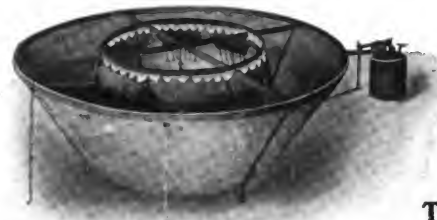


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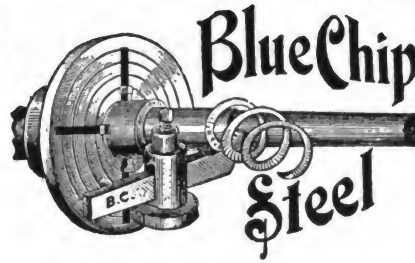


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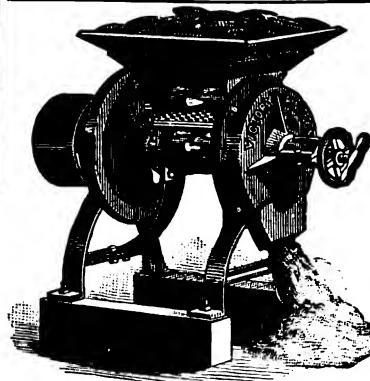
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WE ARE ESTABLISHING ONE AGENT IN EVERY TOWN.
Send for Descriptive Circulars to

Geneva Metal Wheel Co.
GENEVA, OHIO



HENRICKS MAGNETO

Fires your gas or gasoline engine without the aid of batteries.

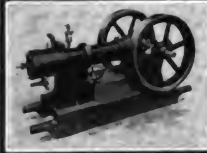
It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

HENRICKS NOVELTY CO.

130 S. Capital Avenue

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THE "ELI" LEADS 'EM ALL

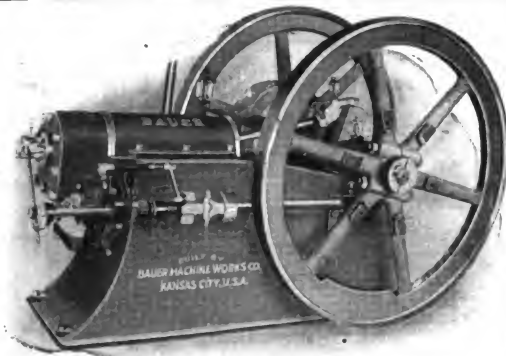


THE "FOOL-PROOF" GASOLINE ENGINE

The "ELI" Gasoline Farm Engine is the only fit engine to have on a farm, where one is a good way from the repair shop. The "ELI" is so simple that there's nothing to get out of order. It will run year in and year out without the tinkering that other engines require. It is the only engine without cams, gears, and levers. We call it "Fool-Proof" because, if some simpleton or a child should monkey with it, he couldn't make it dangerous. It is absolutely safe. Isn't that the kind of an engine YOU want? Then write for our free booklet, telling how and why it is so simple and safe.

MOLINE PUMP COMPANY, Sole Mfrs.,

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BAUER GASOLINE ENGINES..

The Acme of Simplicity and Perfection. If you will examine and compare, piece by piece, you will say there is no other quite so good as the "Bauer." All sizes from 1 1/2 to 20 H.P. Write at once for free catalogue containing long list of letters from satisfied users. Our prices are also very interesting, considering quality.

THE FIRST BLACKSMITH in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily. The Bauer is the best.

Write us Today.

Bauer Machine Works Co.

115-120 W. 18th St., KANSAS CITY, MO.

Dempster Gasoline Engines

SIMPLE, DURABLE, SAFE

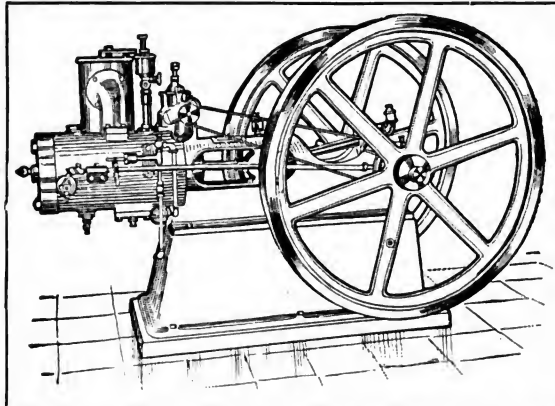
Two Cycle Type. Smooth Running, Practically No Vibration.

2

TO

30

H. P.

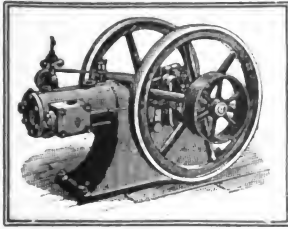


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OUR LINE: WINDMILLS, PUMPS, TANKS, WELL MACHINERY, GASOLINE ENGINES, GRAIN DRILLS, CULTIVATORS

DEMPSTER MILL MFG. CO. Beatrice, Neb.



There is a Feeling of Contentment in the Heart of the Owner of a

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IT DOES THE TRICK! R. F. D. SPECIAL.



This axle runs easier than any other, and requires no attention. "It's a Wonder." STANDARD BALL AXLE WORKS, Lancaster, Pa.

BUILD YOUR OWN GASOLINE MOTOR

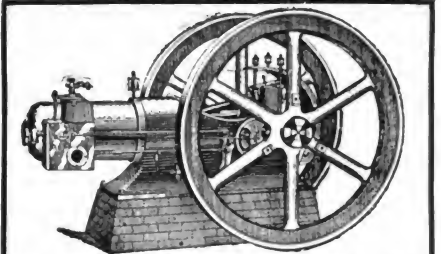


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"The Australasian Coachbuilder & Wheelwright."

A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

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Have You an Engine?



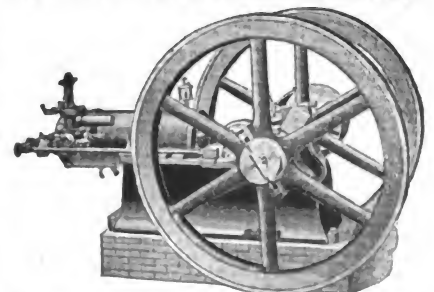
If so. *The Practical Gas Engineer* will tell you how to get the best results from it. A plainly written book telling how to erect, operate and care for gas and gasoline engines. Cloth bound. 152 pages. Sent prepaid, for \$1.00.

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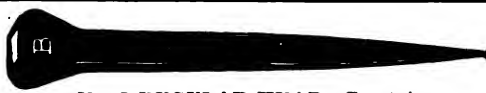
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TRACTION = PORTABLE = STATIONARY



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"BRIGHTON" HORSE NAILS

The letter "B" appears on the head of each nail.



No. 8 CITY HEAD.—Exact size.

**The EQUAL of ANY Nail except
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Box.....	\$3.25	3.00	2.85	2.75	2.70	2.65	2.65	2.65
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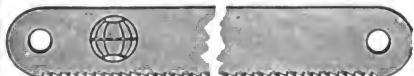
TRY A FEW OF THEM

and be convinced of above statement.

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STANDARD HORSE NAIL CO., New Brighton, Pa.**Your Hack Saw Troubles**

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



West Haven Manufacturing Co.
NEW HAVEN, CONN.

ELECTRIC FORGE BLOWERS**EXCEL ALL OTHERS**

Write
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Prices
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Circulars

A GOOD
BLOWER
THAT
BLOWS
EVERY
BODY
GOOD



MODERN MACHINERY
MAKES THE SMITH'S
WORK
LIGHTER

ROTH BROS. & CO.

27-29 So. Clinton Street,
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SPECIAL NET PRICE
on No. 2 Sarven Patent Wheels.
(In the White)

Steel Tired Wheels. Size of tread and price per set.	Height 36 & 40 & under	Height 38 & 42	Height 40 & 44	Height 42 & 46	Add for 1000 mile axles and boxes set. (welding & setting axles add 80 cents)
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¾ inch	5.85	14.50	15.00	16.00	1.90
1 inch	6.10	16.00	16.75	17.50	2.10
1 ¼ inch	8.25	24.00	25.00	26.00	2.25 H P

Wheels, with Standard Cushion Rubber Tire On.

Size Tire	Height 36 & 38	Height 38 & 40	Height 38 & 42	Height 40 & 44	Axles
1 inch	\$18.75	\$19.00	\$19.50	\$20.00	\$1.90
1 ¼ inch	21.50	22.00	22.75		1.90

We can re-rubber your wheels, prices ranging from \$6.75 up
Prices on other heights, (rubber tired wheels) in proportion, for example: 36" & 44" same as 38" & 42" and 36" & 40" same as 40" & 44" ¾ set orders 42" high, one half price of 40" & 44", etc. Compress of Band Wheels, extra per set, 50 cents.

Painting wheels, three coats, \$2.00 per set, and four coats, \$2.50 per set. The above wheels are standard grade and have been used on new work with entire satisfaction, but for city and country use when extreme hard surface is required, we recommend our record growth white hickory wheels, at a small additional cost of \$2.50 per set.

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Buggy gears with wheels and shafts, oil ready for body, \$16.95 delivered.

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ANGLES, BARS, PLATES, SHEETS, RIVETS, PIPE,
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STEEL

Kept in stock at Cleveland for immediate shipment,
or forwarded direct from mills at lowest market prices.

SEE MONTHLY STOCK LIST.

**THE
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IRON, STEEL
PIG IRON
COKE
Cleveland, Ohio.**



EACH ONE GUARANTEED.

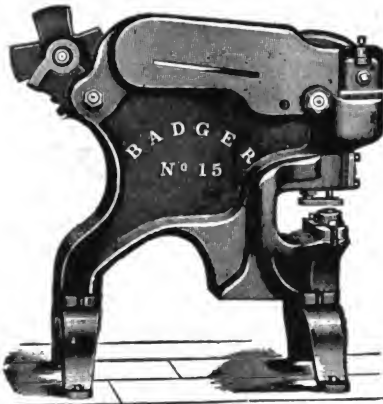
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CHAMBERS BROS. CO.,
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WHAT? YES!

No. 15 THE BADGER No. 15

Will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{5}{8}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.



Weight 800 Lbs.

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Write for Circular and Prices.

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Rockford, Illinois.

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THE STANDARD FOR
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L. S. Starrett says:

"If you find any better tools than Starrett Tools—buy them."

HACK SAWS



STARRETT QUALITY.

Complete Catalogue No. 17 AH. sent on request. You ought to have it.

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CORTLAND, N. Y.

Manufacturers of

*Climax Welding Compound,
Cherry Heat Welding Compound,
and BORAX-ETTE.*



SAMPLES FREE.

BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

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Little Giant

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The Most Powerful Lever Punch and Shear Made.

This is not a new machine—only a new cut showing the improvements we have lately added—making it more valuable for the blacksmith. It is made in three sizes. No. 1 will punch $\frac{3}{4}$ in. hole in $\frac{1}{2}$ in. iron; cuts iron $\frac{3}{4}$ in. thick and 1 inch round. Weight, 500 lbs. No. 2 will punch $\frac{1}{2}$ in. hole in $\frac{1}{2}$ in. iron, cuts iron $\frac{1}{2}$ in. thick and $\frac{3}{4}$ in. round. Weight, 350 lbs. No. 3 will punch $\frac{1}{2}$ in. hole in $\frac{3}{4}$ in. iron, cuts iron $\frac{3}{4}$ in. thick and $\frac{3}{4}$ in. round. Weight 275 lbs. Each machine is equipped with five sets of punches and dies. This machine is made for the blacksmith shop and we DO claim that it is decidedly the best on the market for that place, and can furnish any amount of testimonials to that effect.



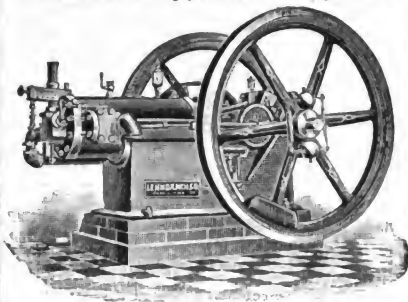
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THE LENNOX ENGINES

GAS OR GASOLINE

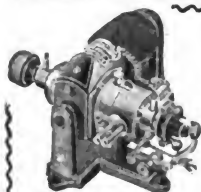
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OUR electric igniter can be cleaned while the engine is running. Other makes cannot be cleaned without stopping and taking the igniter out. Send for catalogue.

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Dynamo Ignition.

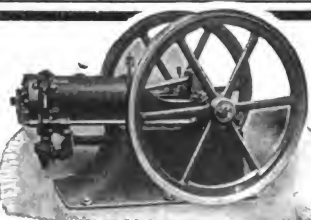
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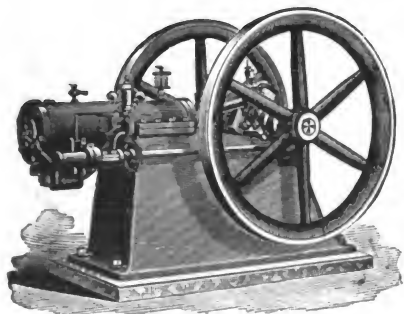
THE ADVANCE ENGINE
FOR PROGRESSIVE SMITHS

No better engine made—a model of perfection, which will stand the most rigid test and be found equal to every shop requirement. Write for our interesting catalogue.

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COLUMBUS GASOLINE ENGINES

ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33, Stating Horse Power You Need.

COLUMBUS MACHINE COMPANY,
Columbus, Ohio.

RELIANCE ENGINES

ABSOLUTELY PERFECT.



Try one for 30 days. If not entirely satisfactory, can be returned at our expense.

The most economical engine in the world.

Fully Guaranteed.

BEAVER MFG. CO., MILWAUKEE, WISCONSIN.

It's the
SPARK
that
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YOUR ENGINE will work better, give you less trouble and carry a bigger load, if you ignite with one of our **Improved Mueller Spark Coils**. Furnished for use with batteries or dynamo. WE GUARANTEE our coils against all imperfections in workmanship and material. If your engine doesn't ignite properly, write us. Information cheerfully given. Correspondence solicited.

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9-10-11 MILLER BLDG. MILWAUKEE, WIS.



Style No. 0,
Cyclone
Portable
Forge.

Easy
Running.
Powerful.
Large
Capacity.

CYCLONE PORTABLE FORGE

The Cyclone Portable Forge, shown here, is a favorite everywhere. Suitable for heavy, as well as light work. Has a 28x40 in. hearth, large capacity coal box and a 14 in. fan. The deep firebox and powerful blast make the Cyclone Style No. 0 capable of doing the heaviest kind of work. The Cyclone has double Ratchet, Adjustable Legs, Solid Frame, Detachable Lever hung on Ball Joint and swinging in chilled seat. FULLY GUARANTEED.

Write today for our FREE Catalogue and SPECIAL INTRODUCTORY PRICES.

FOOS MANUFACTURING CO.,
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OTTO ENGINES

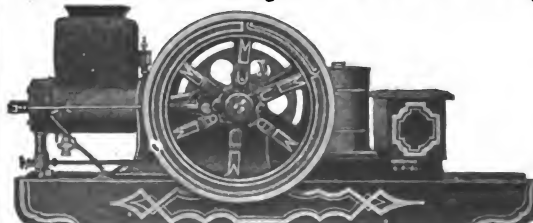
Lasts a Lifetime

The durability of the "Otto" is one of its strongest points. There are fully 200 "Otto" engines in the city of Philadelphia alone that have been in constant use for over twenty years and still doing honest service;—indisputable evidence of correct design, fine materials and accurate workmanship. The life of the average cheap engine in daily use is but five years. Yet the "Otto" costs but little more than the cheap kind.



OTTO GAS ENGINE WORKS, Phila., Pa.
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The Easy Starting LAUSON



5 H. P. Special.

THE JOHN LAUSON MFG. CO., NEW HOLSTEIN, WIS., U. S. A.

Is built for zero weather. It has no water tank and pipes to freeze up. Two pails of water is all that is required to keep the engine properly cooled. This feature and our improved generator valve make this an ideal engine for winter work. It will start as easy and work as well at 20 below zero as in summer.

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Acme Hand Blower For Blacksmiths

It has the unqualified
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Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

Any smith can now renew the bronze bearings in the new Blower in a very few minutes.

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Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
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HANFORD'S Balsam of Myrrh

WILL HEAL

**Bad Galls, Kicks, Wire Cuts, Calks,
Nail Wounds, Wind Puffs,
Thrush, and Any Sore.**

It cleanses and heals. It counteracts the effect of poison from rusty nail wounds, removes proud flesh and gangrene. It will stop a fresh cut from bleeding almost immediately, and heals it very quickly. Is sold under a guarantee. A cabinet free.

Blacksmiths are having great success selling it. Write us for particulars.

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Your Grandfather

used a brick forge and leather bellows. That very fact is a good reason why a "Buffalo" 1905 Forge or Blower should be in your shop.



The
**Blacksmith's
Friends**



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

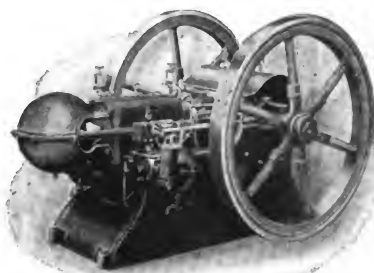
Welds at a low heat, does not fly. Saves time and fuel. **Guaranteed** to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the **Banner Brands**.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-calk welding.

We will send a large free sample to any regular blacksmith.
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

LIGHTNING BALANCED



GAS and * * *
GASOLINE ENGINES

**Are Especially
Suited for
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Power.**

Write for Free Catalogue.

KANSAS CITY HAY PRESS CO.,

482 Mill Street,

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INVESTIGATE The Hercules Hydraulic



**Before
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Buy a
Tire Setter**

National Machine Co.

KEOKUK, IA.

Henderson Hand Power TIRE SETTERS

Set Tires Cold.
Keep the Dish right
Tighten Wood Work
Pull Broken Spokes
Jump in New Spokes
Are Money Makers



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Highest Award**

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

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VOLUME 4

THE

NUMBER 10

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

JULY, 1905

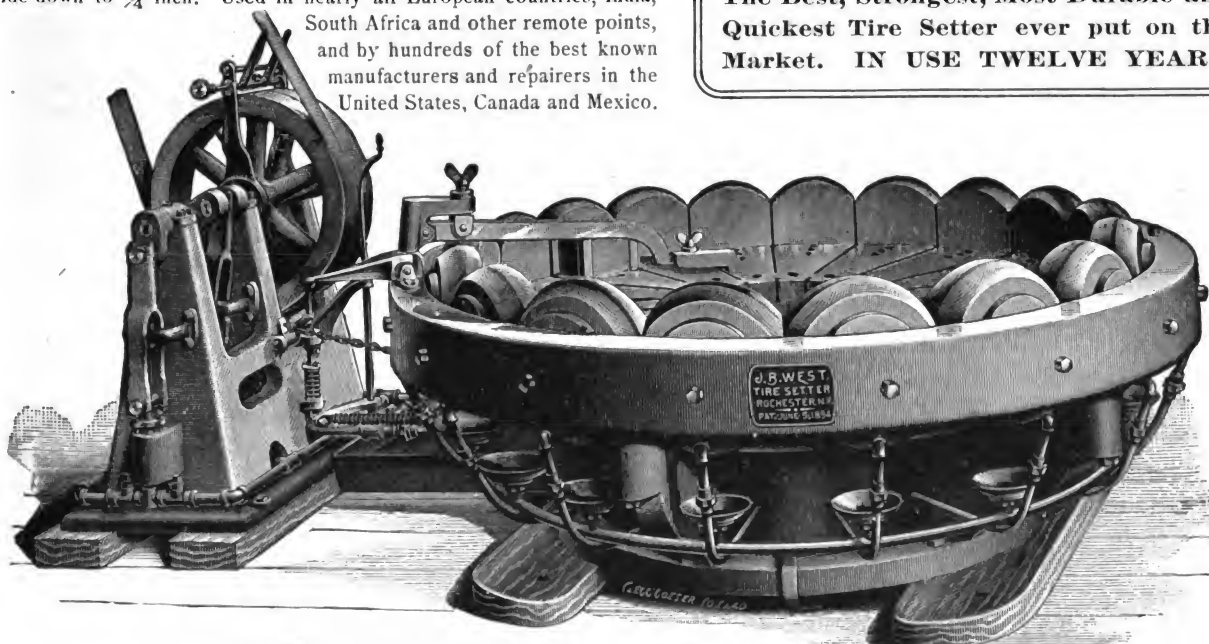
\$1⁰⁰ A YEAR
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shows our**

POWER HYDRAULIC TIRE SETTER

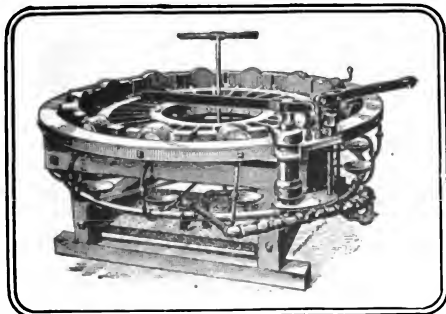
which we make in various sizes suitable for handling tires from 9 inches wide down to $\frac{3}{4}$ inch. Used in nearly all European countries, India, South Africa and other remote points, and by hundreds of the best known manufacturers and repairers in the United States, Canada and Mexico.

**The Best, Strongest, Most Durable and
Quickest Tire Setter ever put on the
Market. IN USE TWELVE YEARS.**



This Cut shows our Hand "Hydraulic Junior"

TIRE SETTER



Designed for use by manufacturers and repairers who have no power or cannot afford to put in one of our large machines. Not so heavy as the power machine, but embodies many of its principles, and worth many times its cost where there is work for it to do. Encircles the wheel and tire, distributing the compression around circumference—the only proper way to set a tire cold. The founder of our Company invented, patented and manufactured "edge-grip" machines when the "West" Tire Setters were the only ones on the market, and if the principle had proved right, we would still be making that kind—but we are not. **We Have Something Better.** Write us and we will tell you more about it.

THE WEST TIRE SETTER COMPANY
Rochester, N. Y.

CARRIAGE MAKER and BLACKSMITH TOOLS

THE "ELITE" BLOWER

is correctly manufactured
and is designed to
meet the demands of
hard service, together
with the greatest
possible efficiency,
durability
and convenience.

IT'S A
MONEY
MAKER.



Fig. 900, 12 inch.

Manufactured by

THE
SILVER MFG. CO.

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Hub Boxing Machines, Spoke Tenon Machines, Band Saws, sizes 20, 26, 32 and 36 inch, Forges, and a complete line of hand and light Power Drills, a 19-inch Post Drill and a 20-inch Round or Square Base Drill with Lever or Screw Feed. The last two drills are used extensively by Carriage Builders and others.

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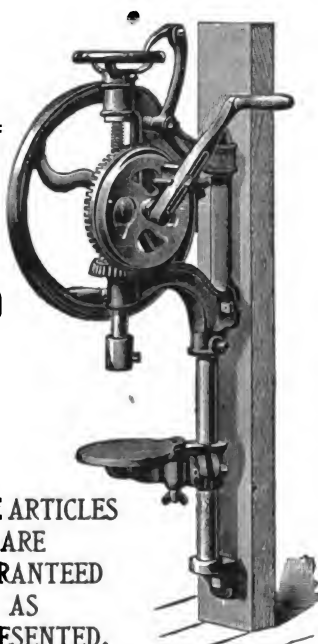


Fig. 731, No. 1.

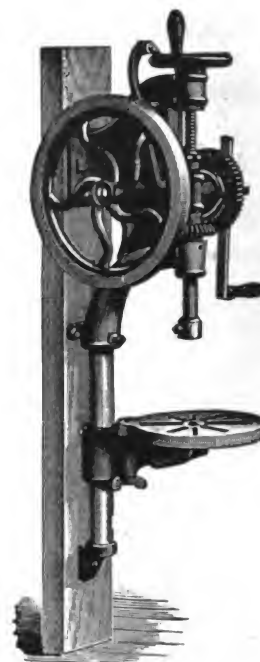


Fig. 742, No. 12.

Special prices are extended to Carriage Makers and Smiths
if this paper is mentioned.

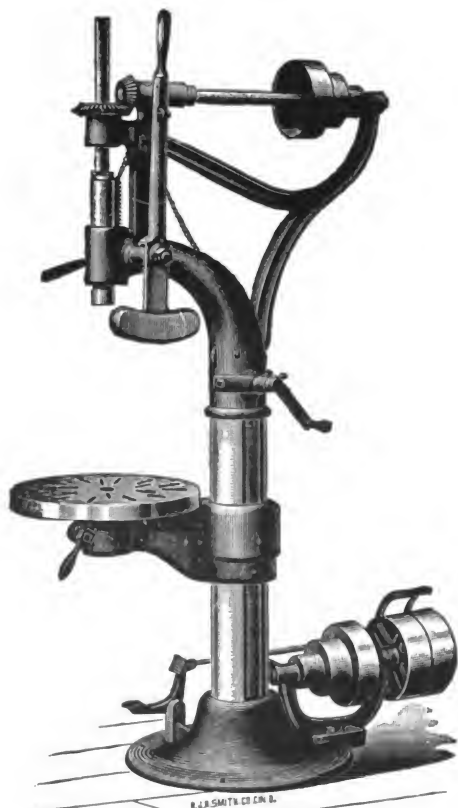


Fig. 850, 20 inch.

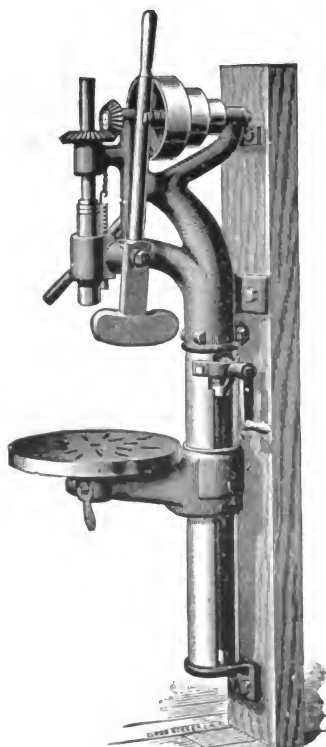


Fig. 727, 19 inch.

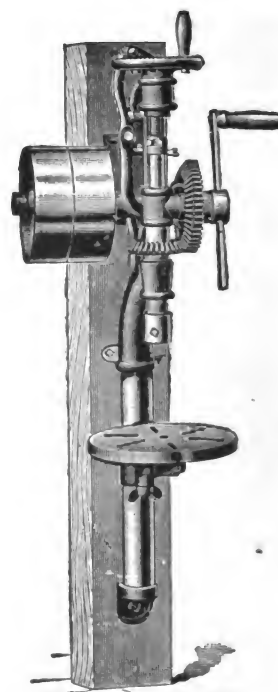


Fig. 746, No. 12.



RUBBER TIRING ?

Do you do it? Is your shop up-to-date? Don't lose customers because you can't take care of your rubber tiring. Buy one of our

\$12.00 RUBBER TIRE APPLYING MACHINES.

No shop complete without it. We guarantee it to do your work and to be satisfactory in every respect. If not, money back. Fair, isn't it? You take no risk. We simply back up our statement.

WHAT THIS MACHINE WILL DO

It will handle one or two wires or a flat band and is adapted to all sizes of rubber tires from $\frac{1}{4}$ " to 2" inclusive. Works equally well on new and old tires.

While it is low in price, there is no better machine on the market. This fact we guarantee. . . .

Complete instructions for operating furnished with each machine. If you desire further particulars, write us for a free booklet.

FREE WITH EACH MACHINE

- | | |
|------------------------|----------------------|
| 1 Bundle Brazing Wire | 1 Can Joint Cement |
| 1 Box Brazing Compound | 1 Can Slippery Paste |

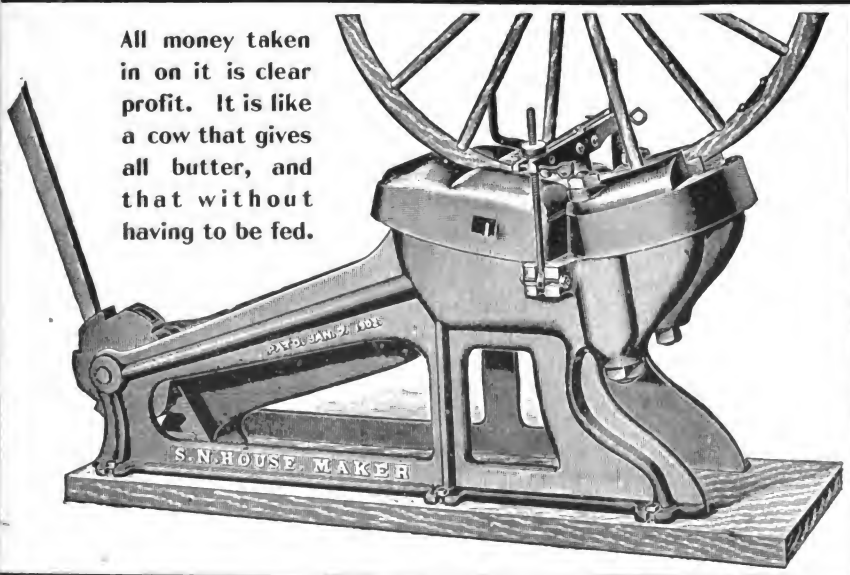
You'll need a Brazing Torch. Our double jet torch at \$3.95 is found on page 198 of our 1905 catalogue. Rubber Tires? We guarantee ours to be right and prices low. See pages 199-200 1905 catalogue. The rubber tiring season is now at hand **ORDER TODAY.** Have you received our **NEW SPRING CATALOGUE**? It's just out. **BEST EVER!** If you haven't a copy, **WRITE TODAY.** It's free to the trade. You can't afford to be without it.

CRAY BROTHERS

DEPT. R CLEVELAND, OHIO

THE HOUSE COLD TIRE SETTER

All money taken in on it is clear profit. It is like a cow that gives all butter, and that without having to be fed.



There are 1400 of them in use now giving perfect satisfaction. You can't make a mistake in buying one. Write to us for the name of your neighbor who has one, for our machines are in use all around you. Don't be persuaded into buying any other machine, for there have been machines sold, and others are being offered now that won't do the work. Do not be deceived by claims that our Cold Tire Setters pull the tire only one way. Any edge-grip tire setter that grips the tire which is to be set, does it just as you would take hold or grip the tire in one place, with one hand, and hold it, and then grip it with the other hand in another place and push the tire with one hand towards the other hand. You see that you would have to pull the tire as much, holding it back with one hand as you would pull it, shoving it up with the

other. And you know also that if a man will make a wilful misrepresentation to sell you, he will rob you if you give him a chance.

Our machine is fully warranted and sold on easy terms. Write us for catalogue and prices.

HOUSE COLD TIRE SETTER CO., Cor. Third and Clark Avenues, St. Louis, Mo.

CAPEWELL HORSE NAILS

ON THE RACE TRACK

THE TESTIMONY OF A CELEBRATED HORSESHOER ON THE GRAND CIRCUIT

Billings Park,
Memphis, Tenn., Feb. 26, 1904.

THE CAPEWELL HORSE NAIL CO.,

Hartford, Conn.

Gentlemen--

While I consider the Capewell Nail the only safe nail to use, I can especially recommend them where pads are used, (rubber, felt or leather). They never break, and I can safely say, during all of last season I did not have a shoe lost or thrown off.

For artistic finish, easy and accurate driving, and absolute safety in every respect, the Capewell Horse Nails are in a class by themselves.

Yours very cordially,

JAMES CLARK.

Made by **The Capewell Horse Nail Company**
HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World

BRANCHES

New York: 103 Beekman St.
Philadelphia: 323 Arch St.
Baltimore: 326 North Gay St.
Buffalo: 11 Ellicott St.
Cincinnati: 720 Main St.
Detroit: 29-31 Farrar St.
Mexico City: Cinco de Mayo, 76.

Chicago: 238-240 Randolph St.
St. Louis: 12-14 North 12th St.
New Orleans: 736 Union St.
Denver: 1530 16th St.
San Francisco: 636 Mission St.
Portland: 554 Worcester Block.
Toronto, Can.: 73 Adelaide St. East.

1905 Calendar and Complete Catalogue Free on Application.

(A Lady can hold him.)

THE BEERY BIT

FOUR BITS IN ONE

Cures Kickers, Shyers, Bolters, Pullers and Runaways.

There are four distinct ways of using it. They sell at eight. Agents make big money selling them. One agent writes: "I am leaving the farm to devote my entire time to the sale of the bit." Send postal for terms to agents.

Prof. W. Beery, Pleasant Hill, Ohio.
A great many Blacksmiths are selling the bits just by showing them to their regular customers at their shops.

Blacksmiths' Tools and Machinery

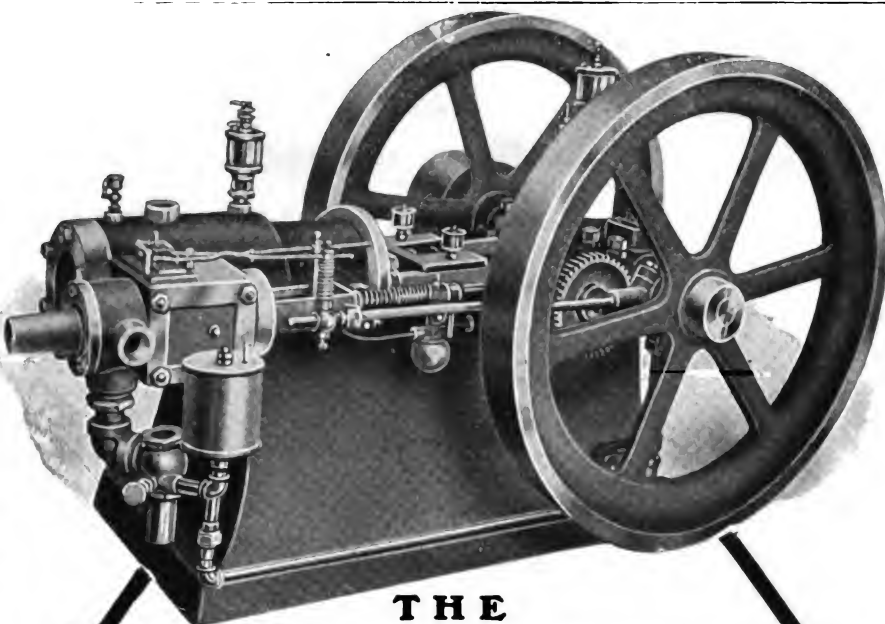
Wagon Builders' and Horse-shoers' Supplies.

Everything Used by the Smith,
Whether made of Iron, Wood or Leather.

Manufacturers of

A. M. W. Whiffletree hooks and soft or hardwood body makers' plugs. Write us.

A. M. Wood Company,
51-53 Beverley Street,
BOSTON, MASS.



THE ROBERTSON

**AUTOMATIC
GAS AND GASOLINE ENGINES
ARE WINNERS. THEY NEVER BALK.**

Always ready for action. Just what every blacksmith requires. A power that can be relied on.

See that cross head, just like a high class steam engine, saves your cylinder 75% with more power, less fuel and no joints on the inside to trouble you. Every working part the simplest. Of course, they cost more to manufacture but we overcome this in the large numbers we make; then, where one goes, more follow, because they are right in every detail.

**Built like a watch for long service.
Smooth running. Economical on fuel.**

Handsome in design and finish, with full guarantee. If you want the best engine made with a proposition that will net you several hundred dollars per year extra. write us today.

THE ROBERTSON MFG. CO.
NIAGARA ST., BUFFALO, N. Y.

High Class Engine and Tool Builders

N. B.—Our plant has been doubled to enable us to fill orders promptly.

Blacksmith Agents Wanted

**WE PAY LIBERAL
CASH COMMISSIONS**



We sell an elegant Top Buggy for only \$37.50, on terms of \$10.00 cash, balance payable \$5.00 month; no interest.

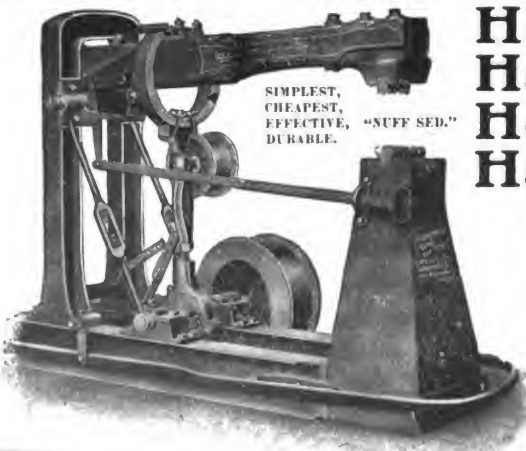
We manufacture a complete line of Buggies, Surreys, Spring and Farm Wagons.

We trust honest people located in all parts of the world. Write us for free catalogue and particulars.

Century Mfg. Co.

Dept. A. B.

EAST ST. LOUIS, ILL.



**Hathorn's
Hard-hitting
Helve
Hammer.**

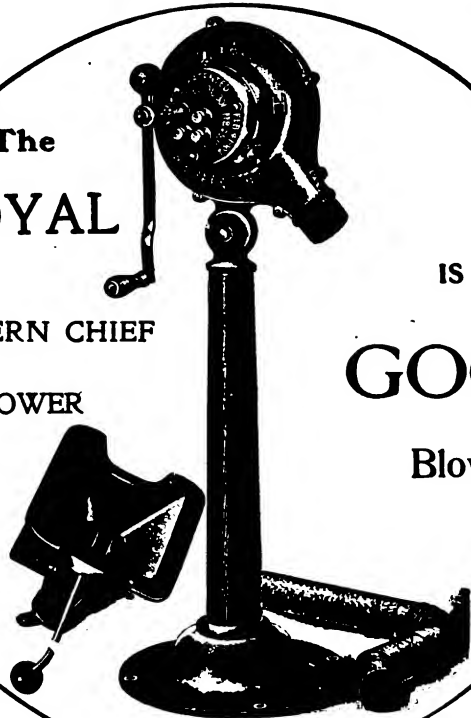
Ask your dealer or write to

**HATHORN
FOUNDRY &
MACHINE
CO.
GRINNELL,
IOWA.**

THREE GOOD THINGS

"ASK THE DEALER."

The
ROYAL
WESTERN CHIEF
BLOWER
IS A
GOOD
Blower



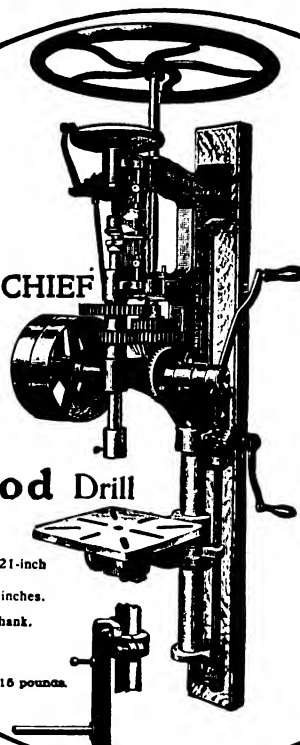
ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.
Gears and Boxes are phosphor bronze and steel.
No spiral or worm gears.
Fan, 12 inches. Weight 100 lbs.
Fire-pot measures 9x11½x4 in. inside.

No. 14 DRILL.

This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.

THE
WESTERN CHIEF
DRILL
No. 14
Is a Good Drill



It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table

Drills to center of 21-inch Circle.
Bores from 0 to 1½ inches.
Takes Bits ¼ or ½ Shank.

Weight, 315 pounds.

The
Royal

No 100

Forge

Is a
Good

Forge



Hearth, 33½x46 inches
Fan, 12 inches.
Height, 30 inches.
Weight, 275 pounds.
Length over all, 64 inches.

No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.



THERE'S GOOD MONEY in the pad business



if you handle a money-making pad

**MORGAN & WRIGHT PADS
ARE GOOD PADS**

Wide-awake horseshoers are finding out that there is a decided difference in the profit-earning qualities of different brands of pads, and Morgan & Wright Pads are getting the benefit of the discovery.

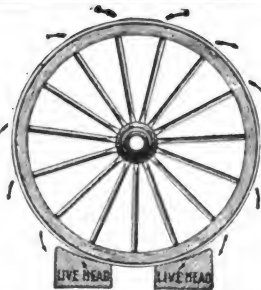
Get a trial order from your jobber.

MORGAN & WRIGHT, CHICAGO

MAYERS COLD TIRE SETTER

GUARANTEED. PERFECT WORK WARRANTED.

Drawing Tire both sides at same time insures uniform dish.
Five minutes to set a tire and do it perfectly.



Note the Arrows.
They show the
"ways."

WHICH
APPEALS TO
MECHANICAL
JUDGMENT

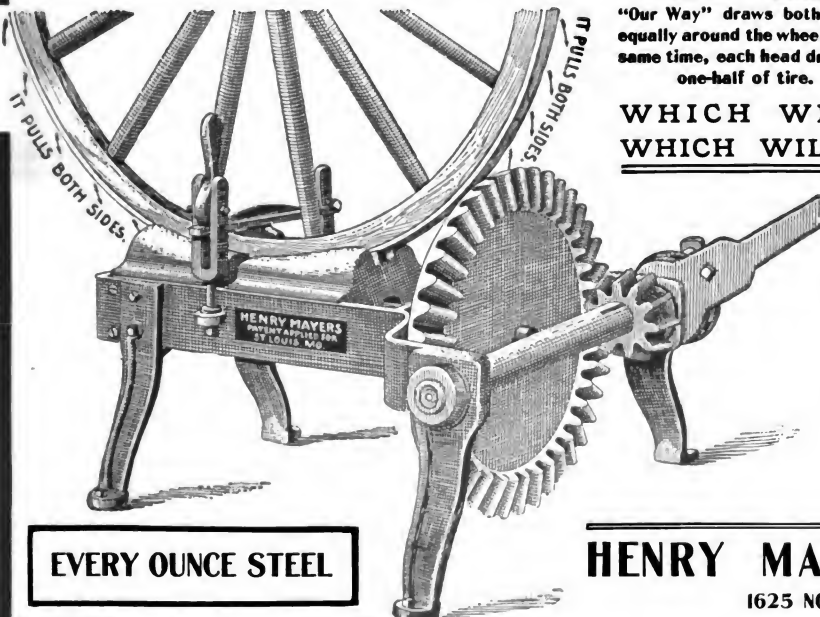
?



Which will please
your customers
BEST?

"All Others" have one dead or
stationary head, and the one
live head must draw tire all
around the wheel.

**WHICH WILL DO THE BEST WORK?
WHICH WILL TIGHTEN LOOSE SPOKES?**



Two heads in slotted frame, brought together by right and left handed threads (2 to inch) on 3 1/2 inch shaft, best steel, in counter sunk nuts (4 inches each). Reversible ratchet lever, bevel gears, 1 1/4 pitch, 2 1/2 face, small wheel 5 inches, large wheel 22 inches. No lost motion. No keys or wedges to take up slack or "to get new hold." Heads can be 4 inches apart or any less space as desired. Grip keys set and release themselves instantly. No driving up or hammering loose, and are so made that they cannot scar the felloe nor kink the tire. Easy terms. Every part fully warranted. Write to-day for full description, price, etc.

SIZES

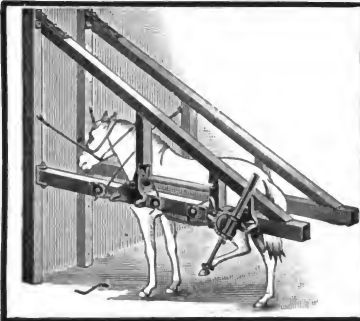
Height of wheel, 24 in.
Height of frame, 15 in.
Height of legs, 10 in.
Width of frame, 12 in.
Total length, 36 in.
Weight, 650 lbs. and
every ounce steel.

EVERY OUNCE STEEL

HENRY MAYERS MACHINERY CO.

1625 NORTH 7TH STREET, ST. LOUIS, MO.

BARCUS HORSE STOCKS

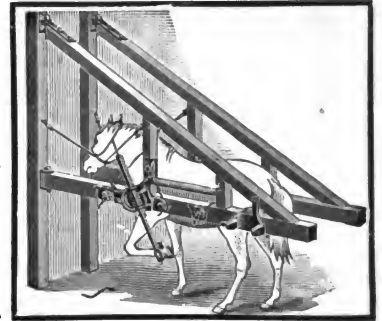


ARE SIMPLE...
RELIABLE...
AND DURABLE

Have no block and tackle with ropes to get tangled and broken. No bracing to roof or floor. Will not skin or chafe the foot. All the objectionable features of the cheap stock have been eliminated. NOT THE CHEAPEST, BUT THE BEST. WRITE FOR PARTICULARS.

GEO. BARCUS & COMPANY,
BOX 61. WABASH, IND., U. S. A.

CANADIAN HORSE STOCK COMPANY—Hamilton, Ontario, Canada



New Badger COMBINED Punch and Shear

The body of these machines are cast in one piece. All shafts, pins and king bolts being made of steel. The mandrel which holds the punch is made square to avoid turning and spoiling the dies when square or irregular shaped punches are being used.

Hand lever works toward the back of machine in both cutting and punching.

Badger State Machine Co.,
JANESVILLE, WISCONSIN.

WILL SHEAR:

$\frac{1}{4}$ x 4" flat iron bars. 1" round iron bars.

WILL PUNCH:

$\frac{1}{4}$ " hole through $\frac{3}{4}$ " round plate, also punch to the center of 12 inches

Weights
600 lbs.



WHEN ORDERING ANYTHING
IN THE LINE OF

STEEL SHAPES

FOR REPAIRING PLOWS, CULTIVATORS,
AND OTHER IMPLEMENTS, BE SURE TO
ASK FOR "**STAR**" GOODS AND GET
THE BEST. ALL QUALITIES AND SIZES
AND EVERYTHING GUARANTEED.

STAR MANUFACTURING CO.

CARPENTERSVILLE, ILL.



SPAVINOFF CURES

Spavin, Ringbone, Grease Heel, Sweeney, Windgall, Enlargements, Curb, Galls, Sores, Pollevis, Scratches, Shoe Bolls, &c. Removes unnatural growths and lameness, leaving flesh smooth and clean. Testimonials.

CHURCH BROS., AFTON, N.Y.

\$1.00 per Box, by Mail. For HORSES AND CATTLE.

METAL SHINGLE ROOFING...



With Montross Telescope Side-Locks is the best roofing in the world for house or barn. Storm proof. Easily applied. Catalogue, Prices and Testimonials free for the asking.

Montross Metal Shingle Co., CAMDEN, N. J.



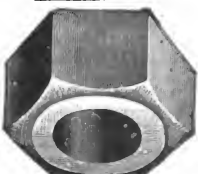
STEEL STAMPS

Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, etc.

Geo. M. Ness, Jr.,
61 Fulton St., N. Y.

Price list sent upon application.

SPECIFY



"MILTON" NUTS & WASHERS

MANUFACTURED BY
THE MILTON MANUFACTURING CO., MILTON, PENNA.



THEY ALWAYS GIVE
SATISFACTION.
THE PRICE WILL
INTEREST YOU.

**Mr. Blacksmith, the U. S. GOVERNMENT Has Recognized Merit
and Stamped Its Approval on the**

BROOKS COLD TIRE SETTER

By placing same in the Government shops. So do hundreds of smiths all over the country commend the

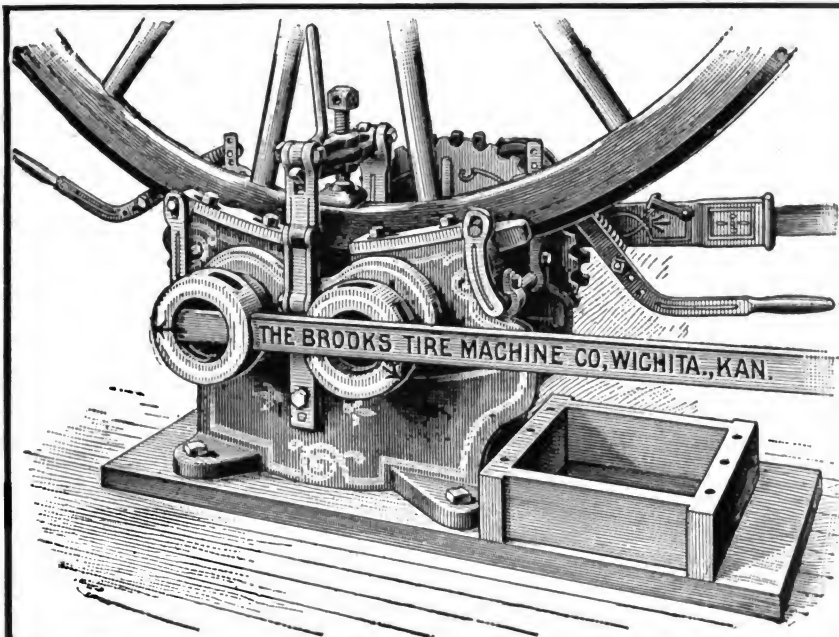
BROOKS

in the highest terms as the greatest money making machine in their shops.

Don't throw money away on experimental tire setters. Get the results of twelve years' experience.

THE BROOKS WAS PERFECTED BY LONG EXPERIENCE. IT SETS A TIRE QUICKLY AND PERFECTLY. NO KINKING OF TIRES. AUTOMATIC GRIP KEYS. Every machine warranted.

One price to all and we extend to you very liberal terms. Write today.



THE BROOKS TIRE MACHINE CO.

121 NORTH WATER STREET, WICHITA, KANSAS

A REVELATION TO BLACKSMITHS

**You have no idea what can be done with the
LAFFITTE PATENT WELDING PLATES**

until you try them. Steel is welded as easily as Norway Iron. Every weld is perfect and the chemical action of the plate produces an absolutely homogeneous joint. No departure in method is required, any intelligent blacksmith can use them and effect a saving of at least one third in time and fuel.

If your dealer does not carry them, send us his name and we will send you, free of charge, samples sufficient to make a good trial.

F. R. PHILLIPS & SONS CO.

Penna. Building

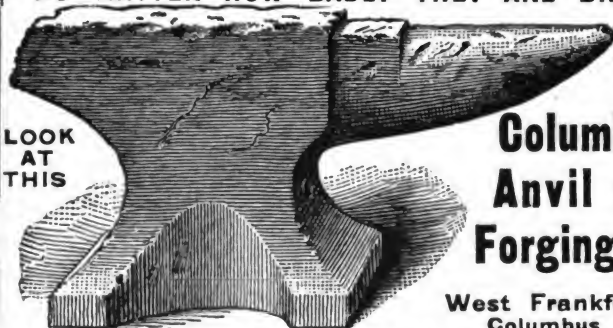
Philadelphia, Pa.

Sole American Agents

THE AMERICAN BLACKSMITH

NO MATTER HOW BADLY THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.

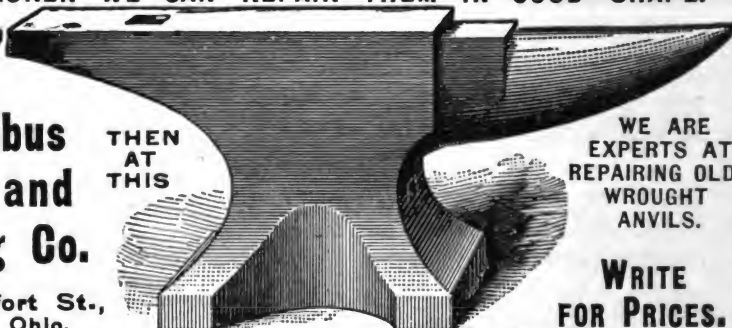
LOOK
AT
THIS



**Columbus
Anvil and
Forging Co.**

West Frankfort St.,
Columbus, Ohio.

THEN
AT
THIS



WE ARE
EXPERTS AT
REPAIRING OLD
WROUGHT
ANVILS.

WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

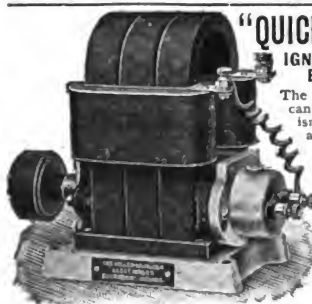
ASK YOUR DEALER FOR THEM.

HONEST DEALINGS

Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interest will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

**HIGH GRADE
Carriage and Wagon
SPRINGS**

TROY SPRING WORKS
TROY, N. Y.



"QUICK ACTION"
IGNITING DYNAMOMETER
Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.
The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

Locations for Industries

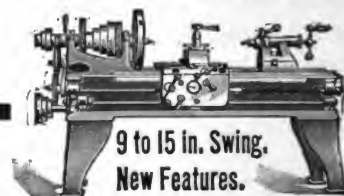
*Erie Railroad System
New York to Chicago*

The Erie Railroad System's Industrial Department has all the territory traversed by the railroad districted in relation to resources; markets and advantages for manufacturing, and can advise with manufacturers of specific products as to suitable locations, furnishing them with current information of a comprehensive nature, dealing with the project in its full relation to manufacture and commerce.

Address

LUIS JACKSON

Industrial Commissioner, Erie Railroad Company
21 Cortlandt Street, New York.



9 to 15 in. Swing.
New Features.

SEBASTIAN LATHES are Good Lathes
Catalogue Free. Sizes 9, 10, 13, 15 inches.

Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and tailer rests, large and small face plates and countershaft go with each Lathe. Foot Lathes, Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert Street, CINCINNATI, OHIO.

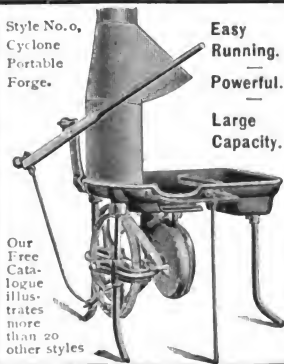


THE
KITTERMAN
INVENTION CO.

81 W. Washington St.
CHICAGO, ILL.

Manufactures all kinds of Rubber Pads and Taped Shoes and Screw Calks at prices to defy competition. Get our big Circular and know the rest.

Style No. 0,
Cyclone
Portable
Forge.



Easy
Running.
Powerful.
Large
Capacity.

Our
Free
Catalogue
illustrates
more
than 20
other styles

CYCLONE PORTABLE FORGE

The Cyclone Portable Forge, shown here, is a favorite everywhere. Suitable for heavy, as well as light work. Has a 28x40 in. hearth, large capacity coal box and a 14 in. fan. The deep firebox and powerful blast make the Cyclone Style No. 0 capable of doing the heaviest kind of work. The Cyclone has double Ratchet, Adjustable Legs, Solid Frame, Detachable Lever hung on Ball Joint and swinging in chilled seat. FULLY GUARANTEED.

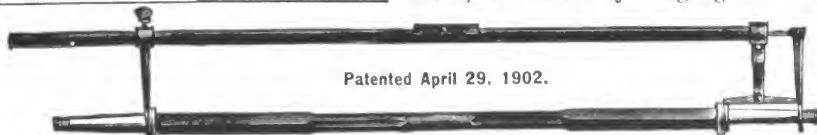
Write today for our FREE Catalogue and SPECIAL INTRODUCTORY PRICES.

FOOS MANUFACTURING CO.,
28 Sheridan Ave. SPRINGFIELD, OHIO.

TRY THIS AXLE GAUGE 30 DAYS FREE

Sent anywhere on trial. No shop complete without it. Once used, always used.

THE REYNOLDS AXLE GAUGE excels all others in simplicity of adjustment, and accuracy of gauge.



Patented April 29, 1902.

Read what M. O. SANBORN OF LAKEWOOD, O., says about it: "I have used the Reynolds Axle Gauge about two years and I consider it the most valuable tool in my shop. It saves more time, labor and money than any tool I use. Simply couldn't run my shop without it."

Sold by the Leading Jobbers. Write Today for Full Description and Interesting Prices.

E. T. BUHL MFG. CO., CLEVELAND, OHIO, Dept. A

TOOLS

FOR THE
HORSESHOER
AND

**BLACKSMITH
IS OUR SPECIALTY**



New Rounding Hammer.

FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

Champion Tool Co.
Meadville, Pa.

TRADE MARK



Our Trade Mark

Represents the only Tool
required to operate the

BRADLEY Ball Bearing Shaft Coupling.

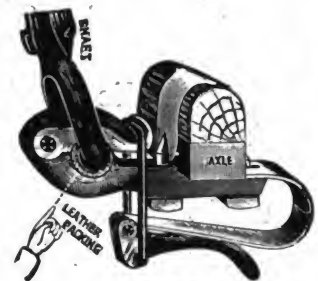
A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,
Syracuse, New York.



OPEN.



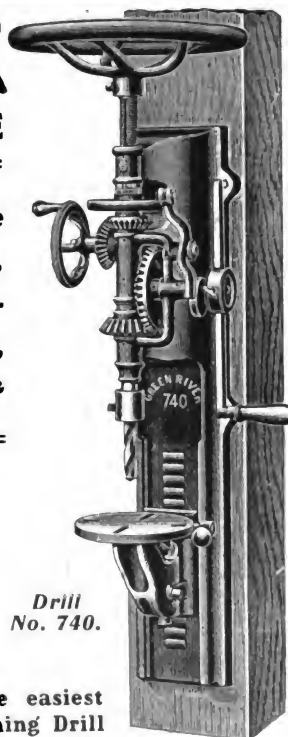
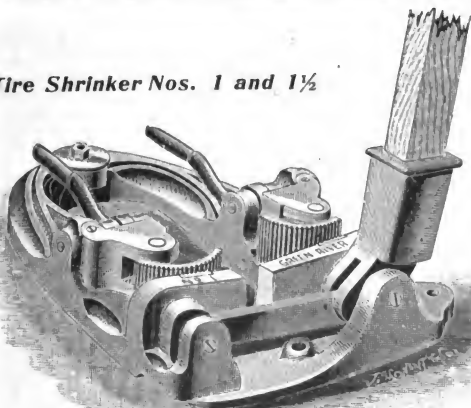
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GREEN RIVER

STANDS FOR THE HIGHEST GRADE

Blacksmith's Drills, Tire Benders, Tire Shrinkers, Mandrels, Swage Blocks, Bolt Cutters and Nut Tappers, Screw-Cutting Dies, Reamers, Screw Plates, and Tap Wrenches. * * *

Tire Shrinker Nos. 1 and 1½



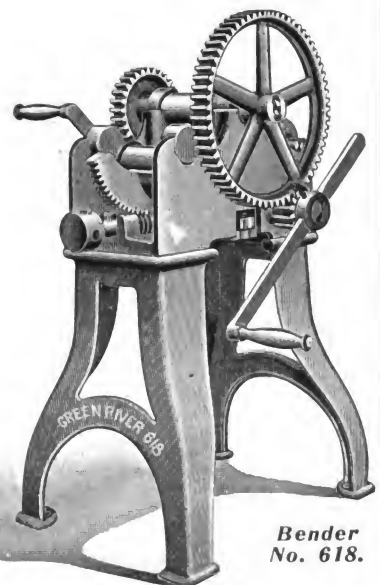
Drill
No. 740.

The easiest
Running Drill
in the world.
Ball Bearings, Solid Cast Back,
Automatic Feed and Swinging
Table.

GUARANTEED.

WILEY & RUSSELL MFG. CO. GREENFIELD, MASS.

We especially invite during the month of
July every Blacksmith and Wheelwright in
U. S. and Canada to send for our LARGE
CATALOGUE, FREE.



Bender
No. 618.

Buffalo

No. 200

The Only Blower Built that is Unconditionally Guaranteed for five years against all bills for repairs. Send for sample guarantee bond which goes with each machine sold.

This Blower is regularly built to run right hand as per cut. Also supplied left hand.

Buffalo No. 201 Blower can be turned either way, but is otherwise identical with No. 200.

Offered free to first buyer in each county, with No. 200 or 201 Buffalo blower, provided you mention AMERICAN BLACKSMITH. Armor plate frame. Unbreakable; light; strong. Upsets bands and tires $1\frac{1}{8} \times \frac{1}{4}$ in. Fastens to post. We make several other sizes and styles.

Buffalo Tire Upsetter No. 1



Buffalo No. 200 Blower

"The Pride of the Modern Smithy."

The Most Powerful, the Easiest Running and the Most Durable Blower Built.



Gold Medal
Goods
are Buffalo!

Buffalo Tools received the Highest Award—A Gold Medal at the World's Fair, St. Louis, 1904.

When the Jury of Awards said "GOLD MEDAL FOR BUFFALO" it meant this: that the highest award went to the tools having the greatest number of good points. As a matter of fact all others lost their bottoms at the start.

Now, as ever, BUFFALO GOODS LEAD THE WORLD. Send for our New Catalogue of Gold Medal Tools and Special Offers.

Buffalo Forge Company

BUFFALO, N. Y.

Manufactured in Canada by
THE CANADIAN BUFFALO FORGE CO.
MONTREAL.





Gold Medal Goods are Buffalo !

Buffalo Tools are prize winners in the shop as well as on exhibition. Built with an unusual amount of brains, good sense and ability, and yet sold at the same prices as the ordinary kind.

Send for our catalogue illustrating and describing these Gold Medal Tools:

No. 200 Blower, the only Blower built guaranteed for FIVE years. Also ten other styles.

Armor Plate Punches, Shears, Tire Upsetters, etc. A new development in blacksmiths' tools.

Ball Bearing Drills, with ball bearings where they belong. Twenty sizes of blacksmiths' drills illustrated.

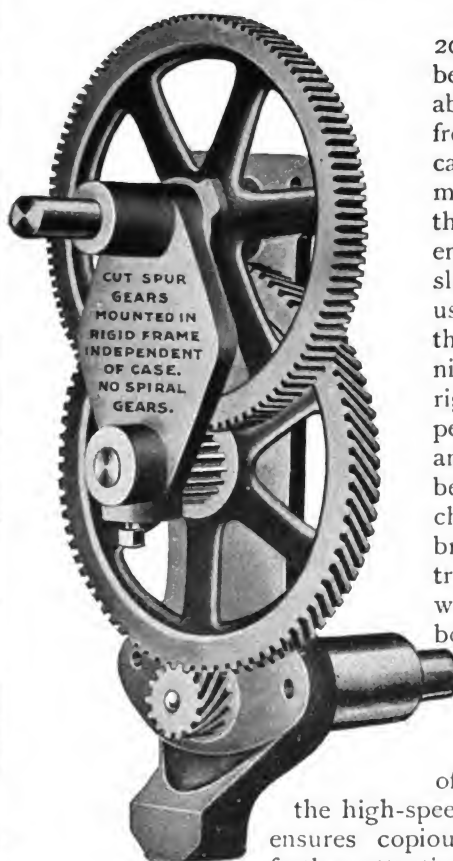
Forges, over one hundred patterns, steel plate, portable, down draft and stationary.



Buffalo No. H H Improved Side and Center Blast Tuyere.

Three blasts: right, left and center. Complete control of fire. Will not burn out. No clay lining. Offered free with No. 200 or 201 Hand Blowers to first purchasers in each county.

A Few Words About THE BEST BLOWER BUILT.



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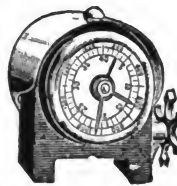
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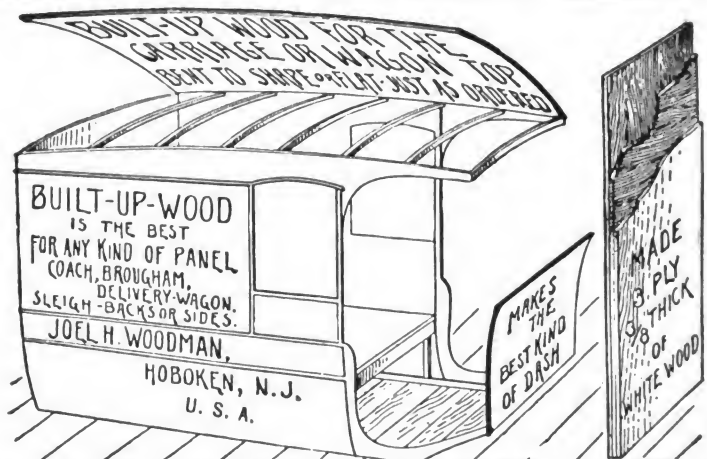
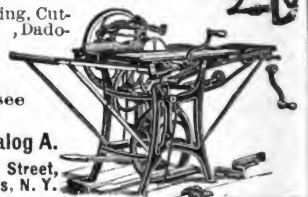
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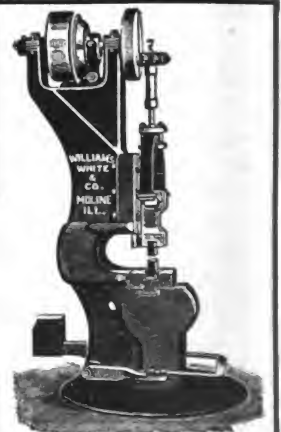


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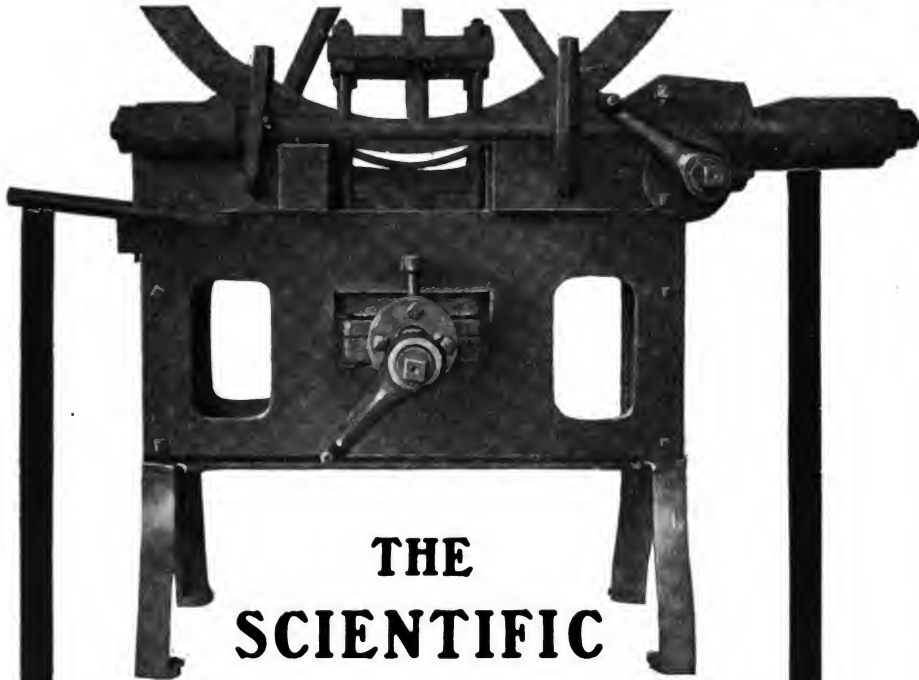
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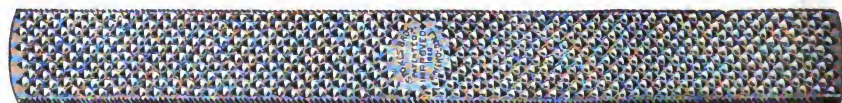
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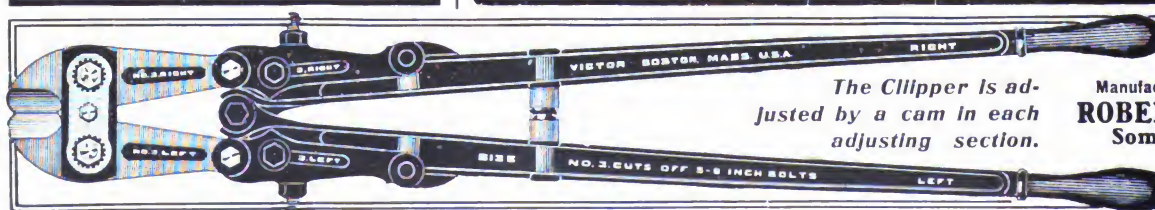
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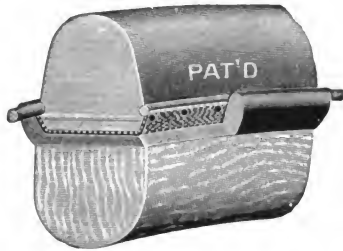


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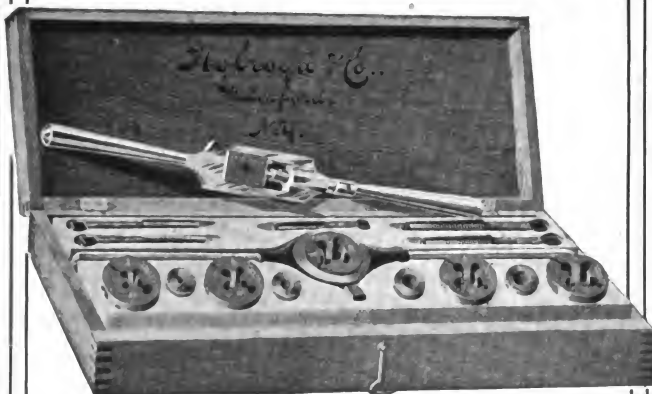
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A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

JULY, 1905

NUMBER 10

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Duly entered as second-class mail matter, at Buffalo, N. Y. Act of Congress, March 3, 1879.

The Portland Fair.

The Lewis and Clark Centennial, now in progress at Portland, Oregon, represents a five million dollar exposition of Western enterprise. It is not so many years ago that the great Western area of the United States was known as a vast, unpopulated country, and even today, the huge manufacturing interests of the East have no comparison in other sections. But the progress made during recent years in the West is astonishing, and one of the main objects of the Portland exposition is to acquaint the public with these interesting changes.

The grounds cover some 400 acres, and ten large exhibit palaces have been erected. The United States government building represents an expenditure of \$250,000, and will contain exhibits well worth a trip to the coast to see.

The Forge Shop in Training Schools.

Much interest is shown in the articles we publish from time to time outlining the methods of instruction in Manual Training Schools throughout the States and the good work that these institutions are doing to elevate the standard of the craft. The forge shop plays an important part in the

training school course today and the instructions our young men receive in the fundamental principles of blacksmithing are especially interesting to the old, experienced smith, who, upon reading such accounts, cannot help but recall how he toiled years ago to learn some of the tricks of the trade. In the advanced classes the pupils are instructed in ornamental wrought iron work and turn out some very creditable models and the graduates of these schools generally make efficient smiths.

A Question for the Smith to Answer.

A recent letter from one of our readers states that each year our friend is losing several hundred dollars by running a painting department and from this statement arises the general question, "Does the paint shop pay?" A majority of the shops throughout the country run a painting department and in a good many cases the smith pays no little attention to this branch of work. During the busy spring season he often finds himself over-crowded with painting orders and spends a generous share of his time in turning them out. But is this kind of work paying the smith? Could he make more money by devoting the time spent on painting to wagon building and blacksmithing? Probably he has never thought to give this side of the question a careful investigation, but has based his opinion on the encouraging amount of painting work which he has been called upon to do, and while he has been working hard at that end of the business, still, on the whole, he has been running his paint shop at a considerable loss.

Of course, no broad statement can be made as to the advisability of the smith running a painting department, for existing conditions such as location, surroundings, etc., will alter cases, and while this work may not pay in some districts, still in other localities it may be found to be very profitable. We would like to hear from our readers who have had experience in running paint shops and to know whether or not they

have found it to be a profitable line. If the paint shop cannot be made to pay we want to know it and want to give these interesting facts to our readers. For the general good of the craft, we want to know why the painting department does not pay and, if possible, find some remedy that will place this business on a paying basis. There is little use for the smith to spend his valuable time on work which in the long run is not netting him sufficient profits. Few men are in business for their health and can afford to work for nothing, and no man works harder and earns his money more than the blacksmith. We believe that our readers will do well to aid us in getting at the bottom of this question, for a thorough investigation may reveal some interesting facts which will be of value, especially to those smiths who are running paint shops at the present time.

A Talk on Shop Cleanliness.

C. E. S.

A short time ago, the writer, who is an old smith, had occasion to visit a number of smith shops in a large city, and of over twenty only two looked as though the owners ever made any attempt to clean them up. Why are these blacksmiths so careless of the appearance of their shops? Why can't they understand that a clean shop, with everything in its proper place and the tools in order, will inspire confidence in customers and draw new ones?

When entering one of these shops one notices the disorderly state of things and does not tarry any longer than is absolutely necessary. Why don't the smiths gather up those odd pieces of iron, shoes etc., which are being kicked around the floor? He tumbles over them a dozen times a day. Why doesn't he throw the stuff which is no good into the scrap box, and put that which is good where it can be gotten at handily and used up? If he would sweep the floor, perhaps the quarter may be found which he lost a few years ago. If he would clean up around the windows and wash the glass he would see how much longer the days

seem. This will let the light into the shop and some sunshine into his heart. You wonder why he don't straighten up the vise, and how he can work with it all askew. His anvil—just look at it—way down on one end and bobbing around every time he uses it. You know a decent job cannot be done with the anvil low on one end and bobbing around, and you wonder why the smith tries to do any work at all on it.

Have you noticed how the drill is all gummed up with old, dirty oil? It must run hard. A little turpentine applied vigorously will clean it so the maker's name can be seen. Having tightened up the nuts and made sure that the whole business runs as it should, ten to one the smith will pick up a piece of thick iron and drill a large hole in it just

have read, give a half day, or even a whole one, or a week if necessary, to cleaning up the old place; see how much better you can work, how good you will feel and how easy it will be.

Thornton Talks on System in the Smith Shop.

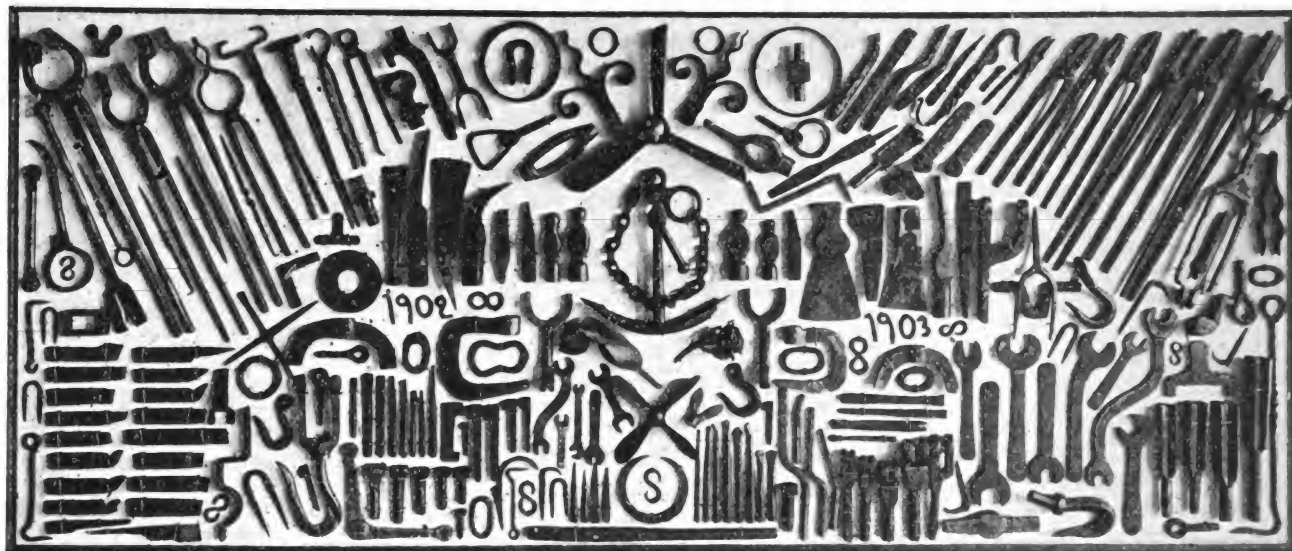
Thornton is that prosperous looking chap who owns and runs the large shop in the wholesale district. He started in a small way in the early days, quickly built up a large trade, and is now recognized by everyone as the foremost smith in the county.

Speaking about system, Thornton said: "I started some ten years ago in that old shack now occupied by your friend Tom. At that time I did my work in just as good a manner as I do

In my opinion it is the only correct way to do business," concluded Thornton as he turned into the new carting and transfer company's office. He said he was going "to get their business."

The New York Trade School.

The New York Trade School was founded in 1881 by the late Col. Richard Tylden Auchmuty. The purpose of the school is to provide young men who have a bent for mechanics the opportunity of acquiring a knowledge of some trade that will be to its possessor a means of livelihood. The system of instruction is known as the "Auchmuty System" and was originated by the founder. Under this system a course of instruction is arranged by which both the practical and theoretical



EXAMPLES OF WORK DONE AT THE NEW YORK TRADE SCHOOL.

for sport. People wonder when they come into this smith's shop what it is that smells so and lay it to the poor horses, perhaps. But the smith knows when he opens up in the morning that it is that old forge tub which hasn't been emptied for—well, it may be for years, and it may be for ever. Why not come over in the night and empty it and fill it up with clean water?

Perhaps the smith doesn't know that when he goes to a man for a loan, the first thing the man thinks of is that old dirty shop, and he thinks of the smith in the same strain. But if the shop is clean, the smith himself clean, and the work done promptly, he is ready to loan any reasonable amount. Besides, if the smith has this kind of a shop he will not have to borrow money very long—it will come by an increase of business.

Of course, Mr. Reader, I don't suppose the above applies to your shop, but if it should, just think of what you

now, but had no system whatever in arranging it. I had plenty to do, but customers were continually kicking because I didn't get things out on time. When I placed one man's work ahead of another's there would be a kick from the second man, so I determined before another year went by, to place my business upon as systematic a basis as possible. Since then I have a system not only in taking care of the work, but in accounting and everything else connected with my business. I make each man responsible to his foreman for some particular part of the work or shop. I have three foremen and they are responsible to me for their entire departments. The prices of all jobs are made known to the foremen having charge of them, thus doing away with the possibility of a man spending more time on a job than it is worth. And so throughout my whole shop you will find some sort of order about things.

branches of a trade are taught. For each trade taught, a course of instruction is prepared which outlines in detail what work the student is required to go through and the order in which the work is to be performed.

The student is first put on work which is very simple, but as skill and workmanlike use of the tools are acquired he is advanced to work that is more difficult and complicated. The work given to students is in each case practical and such as will be met in actual practice. The scientific instruction imparts a knowledge of the trade that is of the highest value. This is given by means of lectures, manuals, diagrams and experiments. The school provides both day and evening instruction and all classes are open to beginners, as well as men already in the trades.

The course in blacksmithing and forging embraces general blacksmithing, tool making, railing and ornamental

work. In forging, the instruction consists of the management of fires, drawing down, bending, shortening, welding, splitting, punching, chamfering, riveting and housework. In vise-work the student is instructed in filing to line, fitting tongues and grooves, clipping, bevelling, scraping and drilling. The student is also taught how to make tools for various machines and trades such as machine and lathe tools, tools for millers, stone cutters, carpenters, plumbers, pipe and steam fitters, tin and coppersmiths. The principles of tempering are also taught the young smith. The equipment of the forge shop is modern in every respect and comprises a blast system, an exhaust system and a supply of standard forges.

Quick Method Re-painting.

Presentation of the Modern Quick Methods of Re-painting. Factors to be Reckoned With. Methods Best Adapted to the Small Shop.

M. C. HILLICK.

Many carriage paint manufacturers have within the past few years put upon the market, and more or less vigorously exploited, so-called quick methods of painting by which it is claimed a saving of several days in time is gained.

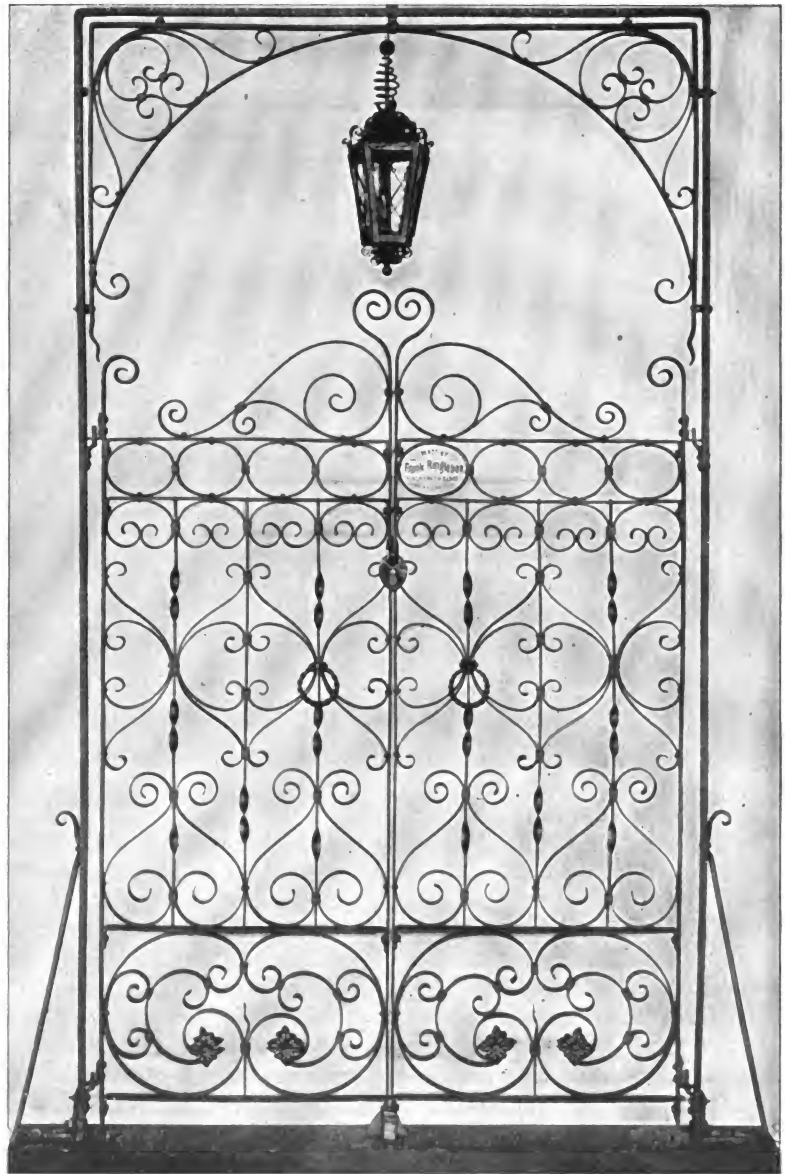
We have recently had before us some comparisons between the lead and oil and the quick systems, as prepared by some of the manufacturers, and in one instance, at least, it is shown that the modern method, so-called, requires 19 days to finish the carriage body, as against 27 days for the oil and lead method. In painting and finishing the running parts the quick method consumes nine days, while the oil and lead method consumes 19 days. The same party makes the claim that for the body the quick method primer is applied and dried ready to work over in one day, whereas six days are required for the oil and lead to dry sufficiently to work over. For the running parts, quick method primer dries in one day, while four days are required to dry oil and lead primer. These comparisons are misleading and fail to accurately represent time allowance for the oil and lead method, as it is handled today. No painter is now using an oil and lead method that requires six days to get it dry enough to work over. The same application may be made in reference to the primer for the running parts. It is arrant nonsense to suppose that the 20th century painter is using an oil and lead method for the running parts, requiring four days to dry for re-coating. In factory shops where the lead and oil method is practised, carriage bodies are primed, and under proper drying con-

ditions, allowed to stand over three days only before re-coating, or puttying, as the case may be. Priming for running parts is handled to dry in two or two and one-half days, and all the way down the line of painting and finishing the time allowance for the various operations of the oil and lead method has been abbreviated without any apparent detriment to the work, either in quality or durability. By the careful mixing of pigments, and omission of non-essential operations, and the judicious selection of varnishes suited to the requirements of the work in hand, this method of carriage painting has been put upon a time allowance basis exceed-

whereas for ordinary work 15 operations only are needed in using the oil and lead method. Quick methods for painting and finishing running parts lay claim to only 10 operations as against 15 operations for oil and lead.

It is no part of the writer's duty to find fault with any of the quick methods being used at the present time. We desire simply to show that comparisons between these systems and the lead and oil system prove but little for the former except in the number of operations involved, and these are confined to the running parts.

The carriage painter in the small shop has it within his control to introduce



FANCY GATE MADE BY NEW YORK TRADE SCHOOL STUDENT.

ing only by a few days, at most, the time credited to the so-called modern quick method.

Some of these quick methods show, for the body, from 15 to 16 operations, and claim 19 operations for oil and lead,

quick methods of re-painting work without resorting to specially manufactured products for such work, and against which, in small communities, intense prejudice often exists. The average vehicle owner in country districts and

small communities generally, has an unshaken faith in the virtue of oil and lead as the basis of good carriage painting, in view of which it would seem clearly a matter of policy to adjust this method to meet all demands rather than risk any portion of his business by turning away after strange and untried preparations. What the carriage painter in the small shop located in suburban and country districts needs to do first of all, is to suit his methods to the individual demands of his customers. Study their wants and desires and adjust the painting methods accordingly.

A presentation of modern quick methods of re-painting simply includes the pigments and colors and varnishes

In some jobbing shops the primer is made of two parts raw linseed oil, one part rubbing varnish and one part turpentine, with the same proportion of coach japan mentioned in the first formula. This primer carries only a mere stain of white lead and some coloring pigment, and is mixed as needed, so that there is no gummy or fatty primer to use. Both body and running parts are treated with this primer which, under good drying conditions, will harden to work over in two days. Over this primer a lead coat is used, consisting of one part raw linseed oil and five parts turpentine, with a teaspoonful of coach japan to each pint of the mixture, the liquids thickened

exacting. Coming to the varnishes we find all sorts and conditions to meet the most diverse requirements. For the best class of work where the time allowance is usually dictated by the painter, we have for the body surfaces pale rubbing varnish drying hard to rub in from three to four days and over this a finishing varnish that hardens ready for service within three or four days, with varnish for running parts to correspond. Then for the quick method advocate we have quick rubbing body varnish that dries to rub in from 24 to 36 hours with a body finishing to dry ready for service within two days. To correspond with this, pale gear finishing varnish is furnished that dries so that it can be used



VIEW OF BLACKSMITH SHOP AT NEW YORK TRADE SCHOOL. STUDENTS AT WORK.

used in painting new work. All latter day processes employed above the lead coats are quick as compared to those formerly employed, and one method is practically as quick as another when used under the same conditions. Oil and lead for priming as now generally prepared, consists of say, three parts raw linseed oil, one part turpentine, with a gill of coach japan used to each quarter gallon of the oil and turpentine. Only pigment is added in sufficient quantity to stain the liquid. In earlier days it was customary to make the primer heavy with pigment, and this practice delayed the drying of the primer more than the oil and lead combination which has so long and unwarrantedly figured as a "bugaboo" to frighten the novice and young painter.

with white lead and some chosen coloring pigment to the proper consistency to work under a camel's hair brush.

Quick method putty consists of dry white lead, three parts; bolted whiting, one part; these mixed in equal parts of quick rubbing varnish and coach japan. Roughstuff to match consists of equal parts, by weight, of any good American filler and keg white lead mixed to a stiff consistency with equal parts of coach japan and quick rubbing varnish, the mass then thinned with turpentine to the right brushing consistency. Over roughstuff to reduce the number of operations and shorten the time allowance, omit the guide coat. Quite as fine surfaces may be rubbed without the guide coat as with it. Japan ground colors are quick enough to suit the most

within about 12 hours. Anything quicker than this is hardly to be expected or asked for.

Supplementary to these quick drying materials, the quick method of painting and re-painting depends also upon the shop devices for saving and facilitating work. The small shop painter must reckon with these factors no less than must his brother workman in the larger shop. Quick method work must have the aid of quick handling devices of every sort, many of which have already been illustrated in *THE AMERICAN BLACKSMITH*. Then suit your method to the demand of each customer and the quick method problem is solved.

EDITOR'S NOTE:—This is the fourth article of Mr. Hillick's series on vehicle painting. The next, "Seasonable Styles,"

will appear in an early number, and will treat on the latest fashions in vehicle painting.

An Illinois Shop With an Apiary.

WILLIS JOHNSON.

My shop is in the country and is 16 by 36 feet. I have a 2 H. P. gasoline engine manufactured by the International Harvester Co. of Chicago. I run my disc sharpener, saw-gummer, polishing and emery wheels and a wood turning lathe with the engine and I believe it could handle just as many more machines. I would advise the brother, who has use at all for a helper, to get a gasoline engine. I tried running my disc sharpener by hand but I

gasoline engine with which I run a rip saw, a band saw, a jointer, a spoke tenoning machine, an emery stand, a grindstone, two drills, a trip hammer, a disc sharpener and a forge. I think a gasoline engine is much better for a repair shop than a steam engine, as it is always ready to go and requires no attention except to keep it oiled and clean. A steam engine takes too much time to keep the water and fire right. The following are some of the prices I get for work:

Sharpening plows.....	\$.25
Pointing plows.....	.75
Sharpening cultivator shovels.....	.40
Pointing cultivator shovels.....	1.60
Setting tires.....	2.00
New buggy tires.....	5.00
New wagon tires.....	7.00

where there ought to be only one. I do not say a good job cannot be done by this method, but I do say I believe there is an easier and more scientific method of doing it.

If it is a light shaft, take a piece of steel about $\frac{1}{8}$ -inch thick by $1\frac{1}{2}$ or $1\frac{3}{4}$ inches wide and 12 to 18 inches or more long, according to the break. Thin these plates all around the edges and ends, making the ends round. Now concave the plates to the shape of the shaft. Then punch or drill four to six $\frac{3}{8}$ or $\frac{1}{2}$ -inch holes in the one for the top and countersink the holes a little. Now put both plates on with thumb screws and bore the shaft with a twist drill bit. Then take the plates off and

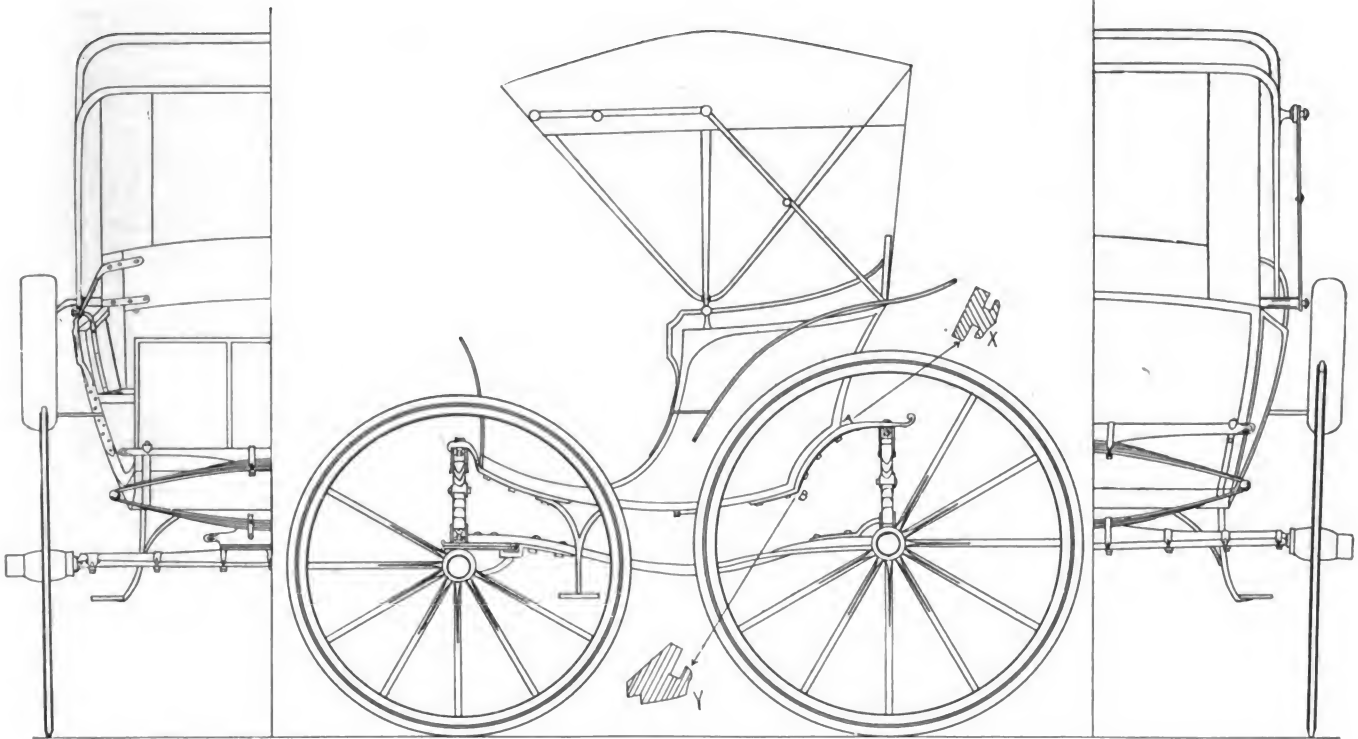


Fig. 3.—HALF-FRONT VIEW.

Fig. 1.—SHOWING SIDE ELEVATION OF END SPRING PHAETON.

Fig. 2.—HALF-REAR VIEW.

found it was a poor way. I see many brothers have side lines. I have thirty colonies of bees which I handle as my side line and it keeps me quite busy in swarming time to see to them and do the work in my shop. I also worked at the gun smithing trade and do yet occasionally, but there isn't much in it in my county any more. In regard to the AMERICAN BLACKSMITH, I think it the best paper the trade has; no smith should be without it. My only regret is that it is not a weekly paper instead of a monthly paper.

A Short Item and Some Prices From Iowa.

W. H. WOODSON.

My shop is 26 by 50 feet, and one and a half stories high. I have a 4-H. P.

Cutting down buggy wheels.....	6.00
Cutting down wagon wheels.....	7.50
Wagon axle.....	2.50
Wagon bolsters.....	1.25
Wagon tongue.....	2.00
Bent hound.....	2.50
Sawed felloes.....	.20
Spokes.....	.15
Buggy axle stubs.....	\$6.00 to 8.00
One new shaft.....	1.35
Cross bar.....	.65

Other prices in the same proportion.

How to Plate a Broken Buggy Shaft Correctly.

J. M. FIX.

Quite a number of smiths make so bad a job of this that it is a disgrace to the profession. They put on great, heavy plates with oval head or Sarven rivets. They also punch drill holes in both plates and then fit them. They frequently bore from top and bottom, and have two or three holes in the shaft

bore holes in the bottom one where the drill marked. Now rivet the plates on tight and smooth, hammering the edges down well to make a neat job.

Plan for the Making of an End Spring Phaeton.

J. LAWRENCE HILL.

The accompanying illustrations are those of a roomy yet attractive phaeton. The design has original features, which, embodied with careful construction, will make a vehicle that will last for years and will give satisfaction.

The side elevation, Fig. 1, presents the design and general character of the entire job. From this view the height and length of the body, height of wheels and length of reach can be obtained. These measurements are to be taken in

conjunction with others obtained from the different views.

The rear elevation, Fig. 2, shows the rear axle bent downward in the center. This is done in order to hang the body as low as desired and still give sufficient opening to the spring.

In Fig. 3, which is the half front, it will be noticed that the front axle is straight but the height of the wheels, 40 and 46 inches respectively, including

at such time, they can be sold at a reasonable price and still net a good profit.

Soliciting Trade and Handling Customers.

CHARLES D. BRIDDELL.

I have had very good success in soliciting trade for the past eight years and will try to give my brothers some pointers on the subject. In the first place always act as if you appreciated

Mr. Blake or some other smith to shoe his horse, go at him like this: "Well, Mr. Brown I have nothing to say about Mr. Blake's shoeing, but as I am in the town I would much appreciate to have at least part of your shoeing. I am sure I can give you satisfaction in this line. Just look at this testimonial which Mr. Hall gave me. I do his shoeing and it has always proved satisfactory. You know that Mr. Hall has the fastest and finest horses in the county and surely he or his trainer would not let me do his shoeing if I did not understand something about it." With a talk something like this, it is quite likely that he will give you a trial. If he should, do a good job and when he is ready to leave say, "Mr. Brown, should this job not prove satisfactory in any way, bring it back to me and I will make it right." By treating him this way he will likely give you more of his trade.

Now in advertising your business, I think an ad in your county paper would do lots of good. Here are a few hints on advertising. Always make your ad brief, but not too much so, and adver-

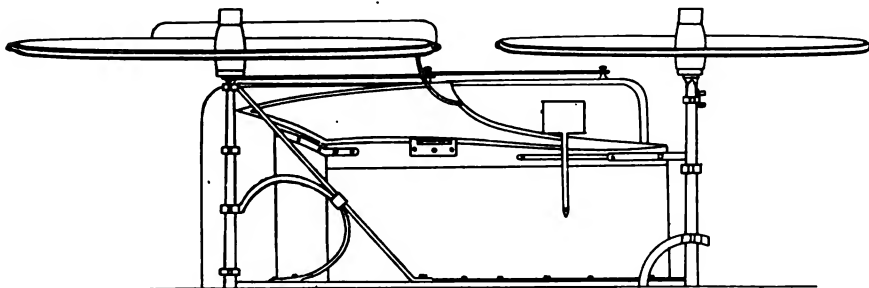


Fig. 4.—SHOWING HALF PLAN OF THE PHAETON.

the rubber tire, make up, with the help of the body loops, the difference of the head block and fifth wheel.

The half plan, Fig. 4, will give the remainder of the measurements, especially with regard to the gear, the shape of the axle, reach and brace, the fantail of the axles being noticeable features.

A section of the back body cross-bar at A, Fig. 1, is shown by X. This is mortised into the side pillars, the rocker plate running along in the form of an L about 4 inches from each end. A section of the bottom back-bar at B, Fig. 1, is shown at Y. The rabbit is for the bottom boards, while the panel fits snugly into the groove and engages with the under groove of the bar at A.

Fig. 5 is a perspective of the finished vehicle.

The color scheme can be almost anything desired, but a quiet color is to be recommended; dark green mouldings with lighter green panels striped light green, or wine color, striped fine line straw color and trimmed in maroon, make a very pretty combination.

The vehicle illustrated this month is one which can be easily built during spare time, and which upon completion would prove a ready seller. The building of vehicles during spare time is an opportunity for more profits no smith should overlook, and being made

your customer's trade even though he brings you a job in which there is no money. To simplify matters we will take Brown as a customer. When Mr. Brown enters the shop, show a smile and speak to him as if you were glad to

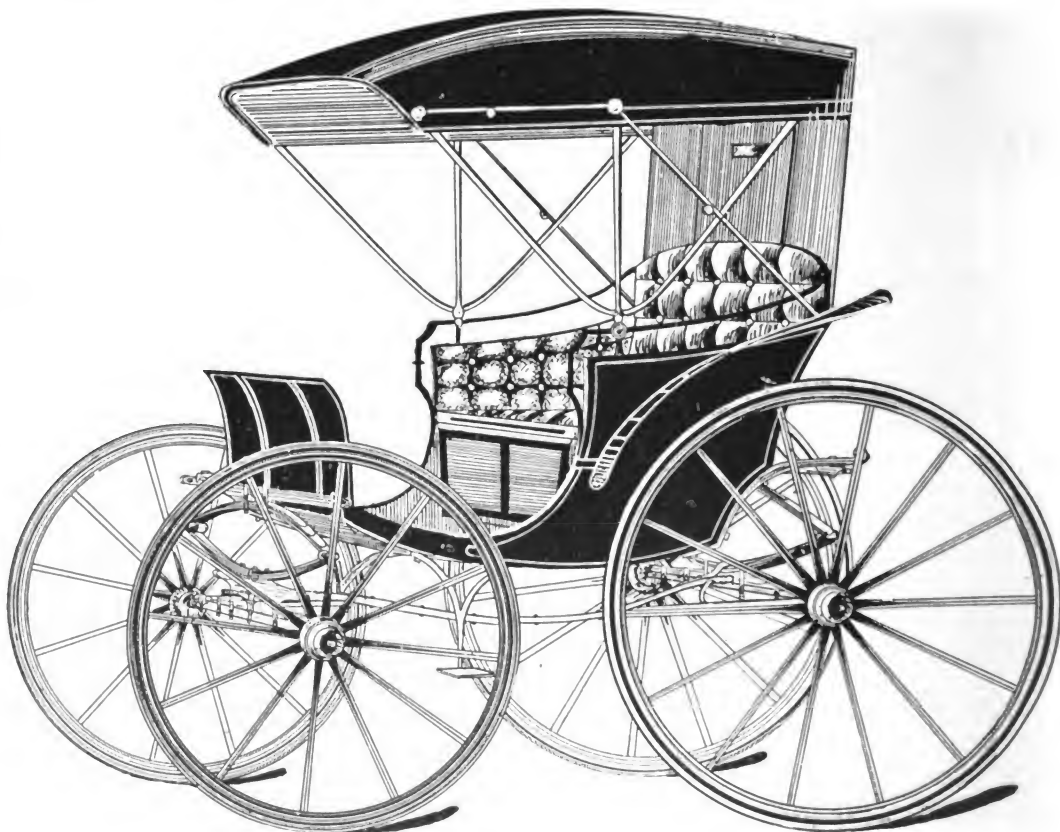


Fig. 5.—SHOWING THE FINISHED VEHICLE.

see him. If he should have only a small job, while you are working on it, think what he would need in your regular line, which we will say is horseshoeing. Say "Mr. Brown, how about shoeing your horses the coming year?" Then if he should say that he has been getting

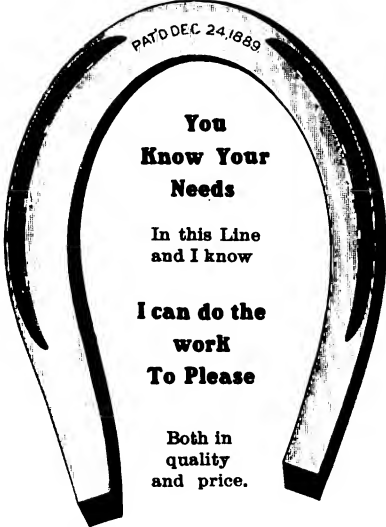
tise what you know customers will want. For instance, in winter, when there is lots of ice and sleet, advertise horseshoeing; in spring, when the farmers want new wagons and repairing done, advertise that and in summer advertise carriage repairing and paint-

ing or whatever you think will interest your customers most. It would be poor business to advertise painting in the winter when your customers did not want any painting done.

In writing advertisements put them in a catchy way with a cut or something to take the eye. Here is a sample:

Charles D. Briddell

First-Class Horseshoeing



**You
Know Your
Needs**

In this Line
and I know

**I can do the
work
To Please**

Both in
quality
and price.

LET ME PROVE THIS

Let it be understood that you are ready for trade and want it and that your work must prove right.

Another very good way for handling advertising is to have some very neat circulars gotten up and sent to your customers and the ones whom you would like to have as customers. Advertise what they need and what you have to offer. I used a circular last year with good success. The way I did was to send them by mail to all the names I could get and when there was a large festival or "turn out," I got some boys to put a circular in every buggy or vehicle which came to town.

Another way to increase your trade presents itself when a man brings a buggy or wagon for repair and only wants a small job done. For instance Mr. A. has brought his buggy to the shop to have it painted. When you look at it you can often see something which needs repairing; speak of that. Say something like this; "As long as you are going to have it painted, why not have new axles put in." Then shake the wheel and say: "You see that they are worn very badly. You have a good top on the buggy and if you were

to have new axles on it and have it painted people would almost think it were new." Then if he wants to know what it will cost, you can talk something like this: "Well, Mr. A., you know the regular price is \$5.50 for new axles, but if you have the painting done at the same time I will paint it for \$6.00 and put the new arms on for even money." In this way you will not be doing anything dishonest and at the same time will be getting trade for yourself. If, for instance, he has a buggy with good axles, wheels, and running gear and an old top, then reverse the talk and say something about the goodness of the running gear and how unbecoming it is to have so common a top on such a good running gear and very often you will get him to allow you to put on a new top.

Blast Apparatus in the Blacksmith Shop.

OSCAR E. FERRIGO, M. E.

To the up-to-date blacksmith the question of an efficient blower, ready at all times, is a matter of much importance, and no one realizes this fact more than one whose blast apparatus has broken down and failed at the critical point in some important job.

While there are several good and efficient blowers on the market, the smith usually has his favorite, and when he thinks the time has arrived when he can afford to purchase a new blower he will naturally buy the one he thinks will best suit his requirements.

Having the blower, it becomes a question as to the best method of setting it up and connecting it with the forge fires. And right here is where the smith or the workmen whom he employs may make such a failure of the job as to cause him to lose faith in his favorite make of blowers. It is very true that the value of the best blower that can be purchased will be very much injured in efficiency or its usefulness lost by wrong setting up and faulty pipe connections.

The average tinsmith knows very little of the laws governing the motion of air under pressure. Neither is he likely to be posted on the best manner of making the pipes, the proper positions for them, or the methods of connecting them. This is not his fault, for the reason that it is very seldom the experience of the average tinsmith to be called upon to do work of this kind.

The blacksmith, too, while an expert at his own line of work, does not have occasion to solve the various problems involved in the setting up of blowers, or the connecting of the pipes that are to

furnish the blasts for his forges, and his daily work is not of a character to lead him to study up the matter with the thoroughness that it demands.

It would seem, therefore, that a few simple rules on this subject, together with drawings showing the proper arrangement of a blower, piping, etc., and some details of the construction and dimensions of the pipes, with a brief description of the same, might prove interesting and perhaps instructive to all blacksmiths and particularly to those about to put in new blowers, or to overhaul old ones and their blast arrangements for the purpose of increasing their efficiency.

On general principles a blower ought to be set as near the point where the blast is to be delivered as possible, and the pipes connected with as few turns and angles as may be. But a blower ought not to be set near the floor, as it is in the way and is more liable to collect dust and so injure its efficiency. The pipes also are always in danger of accidental injury from pieces of iron falling upon them, or being thrown against them. For these reasons it is better to place the blower overhead. The pipes may be placed along the walls,

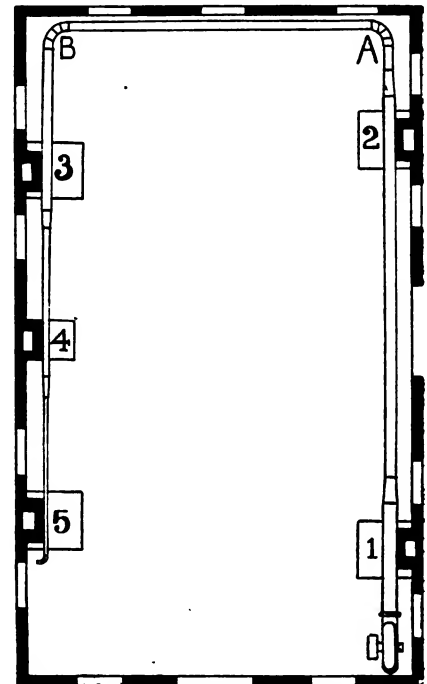


Fig. 1.—SHOWING PLAN OF BLAST PIPES.

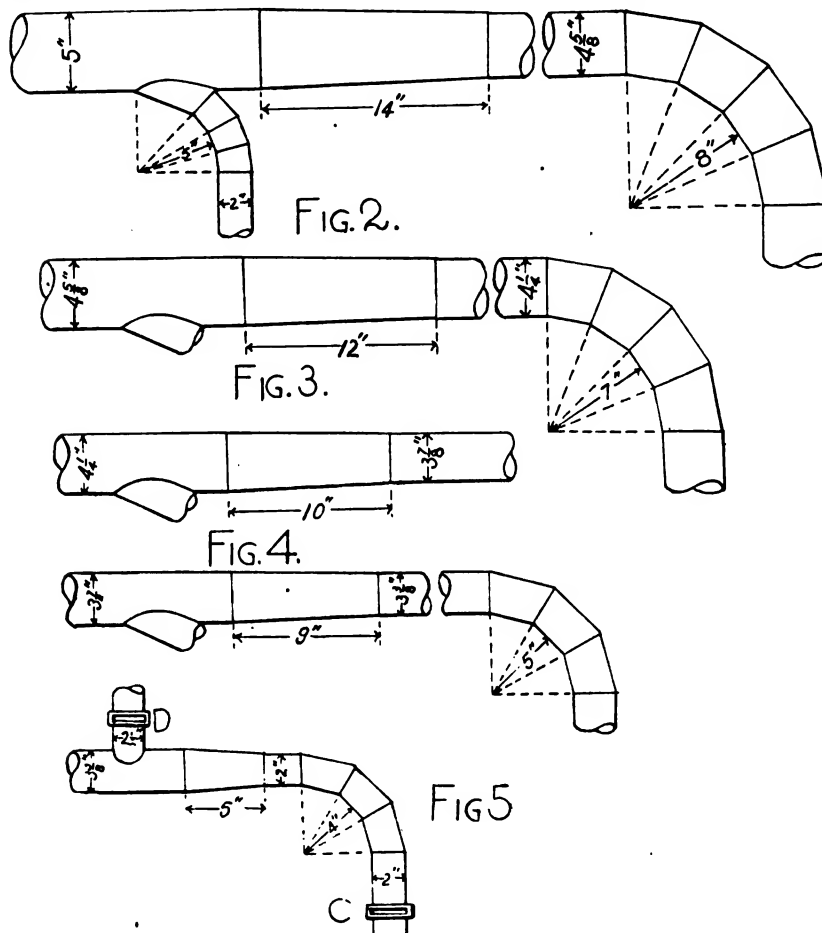
say, six or eight feet above the floor, and then branch pipes brought down to each one of the forges.

In the accompanying engravings, Fig. 1 is a plan of a shop provided with the forges, 1, 2, 3, and 5, and a heating furnace, 4. Special attention is called to this plan and the arrangement shown in it. A pressure blower of good manu-

facture, with a 5-inch outlet, will be ample for this service, and also for another forge or heating furnace, or for an annealing furnace, which may be added later if necessary. The blower should run at a speed of 2650 to 2700 revolutions per minute. Much care should be given to so setting the blower and its countershaft that the shafts may be exactly parallel to each other and perfectly level; and that they be so firmly fixed as to remain so, securely and permanently. Otherwise much trouble and annoyance will be expe-

be so located that the shafts are from seven to ten feet apart. Too close a position will necessitate belts so tight as to cause undue friction of the journals while too great a distance will cause unnecessary friction by the excessive weight of belting.

The blast pipes should be made of a substantial thickness of galvanized iron, and all the joints should be firmly locked or soldered to prevent loss of the blast. The method of making and connecting these pipes, as well as their varying diameters, is clearly shown in



Figs. 2 to 5.—SHOWING THE ANGLES OF THE PIPES AT THE VARIOUS FORGES.

rienced with the belts, and it will be difficult to keep them running correctly on the pulleys. Another important point is that the best belting should be always used, that which when laid out on a board and a straight-edge applied to its edges will very nearly or quite conform to it. The belts should be cut exactly square at the ends, and laced with thin lacings, not over two in thickness in any one place, always parallel to the edge of the belt on the side next to the pulleys, and crossing each other on the opposite side. This will prevent serious shocks due to thick lacings when rapidly running belts pass over small pulleys.

The blower and countershaft should

Figs. 2, 3, 4, and 5. It will be noticed that in all these illustrations a branch pipe is taken off at the full size of the main pipe and that immediately beyond it is contracted to the next smaller size, so as to give an ample supply and force of air to the branch pipe.

It is absolutely necessary that all curves in the pipes shall be of the form and direction shown. Otherwise a large proportion of the pressure of air will be lost. At the right of Fig. 2 is shown the form of elbow required at A, Fig. 1; and at the right of Fig. 3, is shown the necessary form of elbow at B, Fig. 1. Fig. 2 shows the branch pipe leading to Forge 1. Fig. 3 shows that for Forge 2. Fig. 4, that for Forge

3. Fig. 5, that for the Heating Furnace 4, and on the right the final descending pipe leading to Forge 5. The lower end of this pipe shows the proper elbow for all descending pipes and to turn the blast toward the forge, with a blast gate at C, to regulate the force of the blast. In this final descending pipe should be a branch pipe, taken off at right angles, as shown at D, and provided with a blast gate, through which a portion of the volume of air may be discharged when some of the forges are idle. This relief blast gate should be in charge of the man at Forge 5, who should be required to attend to it when necessary.

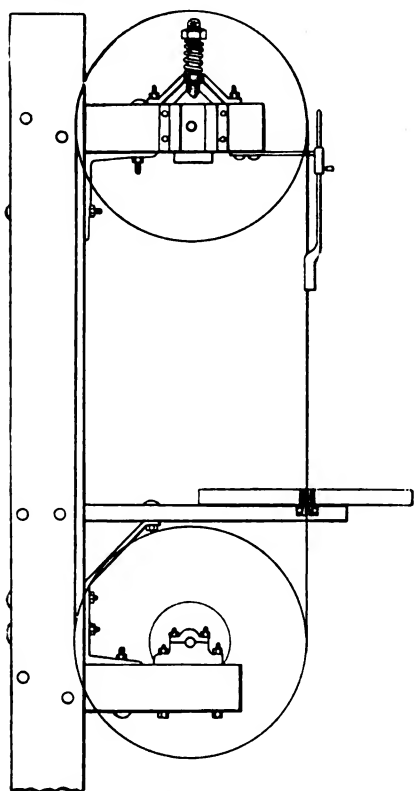
For convenient reference the following diameters and areas of pipes are given, expressed in inches and decimal parts of inches.

5	inches diam.	gives	19.63	sq. inches	area.
4 1/2	"	"	16.80	"	"
4 1/4	"	"	14.18	"	"
3 3/4	"	"	11.79	"	"
3 1/2	"	"	8.94	"	"
2 1/2	"	"	4.90	"	"
2	"	"	3.14	"	"

The calculations and dimensions here given have been carefully made and may be depended upon for actual work in installing blowers. To those who desire to make similar calculations, attention is called to the fact that as each branch is taken off, the area of the next smaller sized pipe should be somewhat in excess of the exact amount given by subtracting the area of the branch pipe, in order to allow for the loss by friction of the air in the pipe. For instance, the 5-inch outlet of the blower equals 19.63 square inches, while the 2-inch branch pipe has an area of 3.14 square inches, subtracting, which leaves 16.49 square inches. The next sized pipe is 4 1/2 inches, which gives an area of 16.80 square inches, thus providing for, and obviating this question of excessive friction of the rapidly moving column of air in the pipes. This difference is carried through the system with very slight changes, so as to keep the diameters of the pipes as near even figures as possible.

Again, and for similar reasons, the aggregate areas of all the terminal openings should be in excess of the area of the outlet of the blower. This area being 19.63 square inches, and the areas of the five terminal openings being each 3.14 square inches, to which is to be added the area of the 2 1/2-inch relief gate, which is 4.90 square inches, we have 20.60 square inches, an excess of about one square inch over that of the blower outlet. This excess might be doubled without any loss in the efficiency of the blower.

For the benefit of any who may wish to make calculations on the capacity of circular pipes, and have not the usual tables of the relations of diameters, circumferences and areas at hand, it may be said that the diameter multiplied by the decimal 3.1416 will give the circumference, and the diameter squared, (that is, multiplied by itself), and multiplied by the decimal .7854 will give the area.



A HOME-MADE BAND SAW.

To illustrate how little intelligence, forethought and calculation is sometimes applied to questions like the ones herein discussed the following instance is given: The writer found a shop in which the blast pipes were composed of vitrified drain tiles, laid about a foot under the ground and leading to the different forges, heating furnaces, annealing furnaces, etc. The force of the blast had gradually grown less until the owners had decided to purchase a larger blower. There seemed no good reason for this and in order to ascertain the condition of the pipes they were dug up, and found to be badly broken by the concussions due to the action of hammers and drop presses. At one point the pipe passed directly under a vertical bolt header and at this point it was crushed into fragments. Why these pipes were ever so placed, or composed of such fragile materials, no one seemed to know. However, the system was promptly condemned and the pipes constructed and located as

shown in the accompanying engravings. This was a success from the start, all the fires getting an ample blast at all times, and the danger of injury to the blast pipes brought down to a minimum.

A Home-made Band Saw.

W. D. BOETTLER.

The accompanying drawing shows a 20-inch wheel band saw which I made and is in use in my shop giving good satisfaction. I got two iron implement wheels of the same size and trued them up in the lathe and covered them with good soft two-inch rubber belting. I built the post and two brackets of four by seven-inch oak, mortised and tenoned together. I made the table bracket of two by six-inch lumber and the table 22 by 26 inches. The bottom shaft has two boxings, one on the bracket and the other extended out to one side by iron brackets fixed to the wood bracket and post. One loose and one tight pulley are attached to it. The upper wheel is run on a pin fastened to a flat piece of iron which works up and down in an iron slide fastened to the bracket. This holds it true. This pin is adjustable so as to allow for different lengths of saws or if a saw breaks, so it can be mended and used again. On this piece, which slides up and down to take up the slack of the saw and relieve the strain, I use a coil spring between the iron bracket and the nut on the rod.

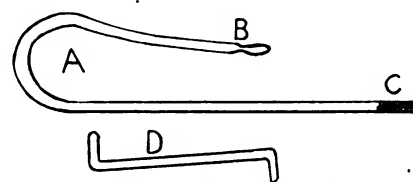
Another Talk on the Tempering of Springs.

DATTON O. SHAW.

These articles upon springs are intended for forge practice where only a few pieces are wanted at a time. Here are a few directions for tempering.

For a very thin friction spring, flash the oil off once; for a little thicker one, flash off twice; for $\frac{1}{8}$ inch, flash off three times, for $\frac{1}{4}$ inch, four times; for $\frac{5}{16}$ inch, five times. To temper a spring larger than $\frac{5}{16}$ -inch without a proper

clearly what you are doing from start to finish. But the rules that I have given will give the beginner something to start with although it may not answer in all cases. For instance, a high carbon steel requires more drawing for a spring than a low carbon. After drawing the temper of a spring to what you think is about right, take its measure, then put it in your vice and press it a little, as when in action. Then compare it with your first measure. If it has set, heat it and put it into shape, but do not draw quite as much. If it



THE TEMPERING OF SPRINGS.

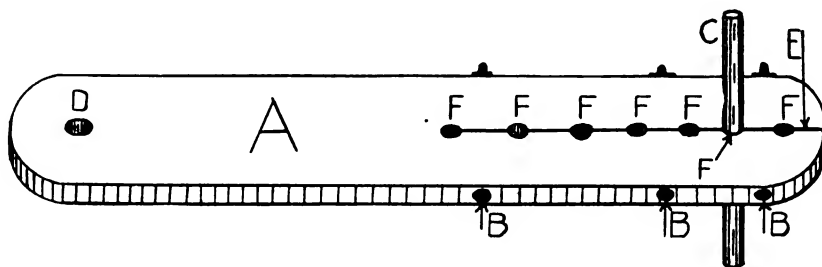
breaks, make a new spring and draw the temper lower.

Chair springs are quite profitable to make but some smiths complain that they break their dies in cutting the thread. This can be overcome if the operator is careful. After forging, heat the end to be cut, to a red and cover with hot ashes. Let it remain until cold, then found the end with a file. If you have adjustable dies, make two cuts and use oil freely. In the sketch are two patterns of chair springs. Spring A is $\frac{5}{16}$ -inch wire. The notch at B is filed and the thread cut at C. Spring D is $\frac{1}{4}$ -inch wire. This is turned at right angles.

A Home-made Spoke Gauge.

WILL O'GORMAN.

The accompanying engraving shows a contrivance which I find very handy. It is a device for gauging spokes when driving them into the hub. A is a board about four inches wide, $\frac{3}{4}$ of an inch thick and two feet four inches long; B B B are bolts running from one side to the other of the board; C is an iron



A VERY HANDY AND EASILY MADE SPOKE GAUGE.

outfit requires a little experimenting and considerable skill. Of course, if your work is heated in a furnace, hardened in a specially prepared bath and the temper drawn in hot oil and tested by a thermometer, you will understand

pin or bolt; D is a hole for the wheel rod; E is a saw cut, and F F F F F are holes for the gauge pin C. The advantage of this gauge over others is that the gauge pin can be held rigidly with no danger of the board splitting.

Reflections of a Proud Pedestrian.

OLIVER WENDELL HOLMES.

I saw the curl of his waving lash,
And the glance of his knowing eye;
And I knew that he thought he was cutting
a dash,
As his steed went thundering by.

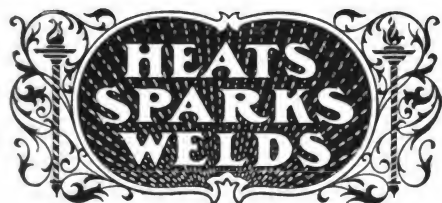
And he may ride in the rattling gig,
Or flourish the Stanhope gay,
And dream that he looks exceeding big,
To the people that walk in the way.

But he shall think, when the night is still
On the stable-boy's gathering numbers;
And the ghost of many a veteran bill
Shall hover around his slumbers.

The ghastly dun shall worry his sleep,
And constables cluster around him;
And he shall creep from the wood-hole deep,
Where their spectre eyes have found him.

Ay, gather your reins and crack your
thong,
And bid your steed go faster;
He does not know, as he scrambles along,
That he has a fool for his master.

And hurry away on your lonely ride,
Nor deign from the mire to save me;
I will paddle it stoutly at your side,
With the tandem that nature gave me.



Midsummer—tire setters should be busy.
Better to run and lose than never to run
at all.

The easiest way to court failure is not to
strive for success.

Some smiths say a paint shop don't pay.
What's your opinion of it?

Are you doing any auto repairing?
There's good money in it these days.

When the customer knows more about
the job than you do, handle him tactfully.

According to the latest census, China
places her total population at 426,447,325.

As light as possible, consistent with proper
protection should be the shoe, especially in
summer.

A smith's business is sure to be interesting
to others when the smith is thoroughly
interested in it.

An advance of a few cents on each shoe
will amount to dollars in a year. Organ-
ization is the recipe. See p. 191.

The proper care of tools saves buying new
ones. But don't hang on to the old tools
too long. Be a modern smith.

One of our most popular premiums is the
rubber stamp and ink pad. You can get it
by sending in a new subscriber.

Recommend it to your brother craftsmen.
It's a good thing. The AMERICAN BLACK-
SMITH is for, by and with the smith.

A good general smith is needed at Elm-
stead, Ont. Interested parties should
write Mr. Wm. Gillespie of that place.

"I make a point to supply what they
want," said Thornton, when asked regard-
ing his success in getting and holding
customers.

Mr. W. G. Nolan, advertising representa-
tive of *The Spokesman*, was a pleasant
visitor to THE AMERICAN BLACKSMITH
offices recently.

Old Ben Franklin once said, "Never
trouble trouble till trouble troubles you."
The burdens of life are sure to come. No
need of going to meet them.

The way to speak of your competitors'
bad jobs is to boost your reputation by
skillful work. Remember that old saying
about actions speaking louder than words?

A poor engine is more bother than its
worth. When you buy—buy the best.
It pays in the end. Consult AMERICAN
BLACKSMITH advertisers. They have good
goods.

Do you agree with everything said in the
Queries—Answers—Notes Department?
It is open to you and several brisk debates
are going on now. What is your opinion
on them?

"Lest ye forget we say it yet." Remem-
ber our premiums for new subscriptions.
Some of our friends find it pays to make
trips a-wheel to the neighboring shops in
good weather and slack times.

In Japan, it is said that in 1902 and 1903
there were nine government schools, 795
public schools and 51 private establish-
ments, besides three institutes established
by the government for the training of
technical students.

According to a report from Dublin, Ire-
land, a recent outbreak of glanders among
horses was of such extent as to necessitate
the city council taking steps to eradicate the
danger of infection and many animals
were killed on suspicion of being infected.

"Saw wood and say nothing" is an old
saying, but he will be without wood to saw
who follows its teachings. In our modern
times it's the man who saws wood and
shouts and hollers about it who gets the
wood to saw. Just so in business—adver-
tise and keep advertising and business
wood will keep you busy.

The land of tomorrow is where many a
smith lives. He answers "Tomorrow" to
everything. He is the man who insures his
shop tomorrow and it burns today—who
sends his bills tomorrow to the debtors who
leave town today—who insures his life
tomorrow and dies today. He is always
a day behind and his family suffer most on
account of his failing.

Preaching not netting him sufficient for
the proper support of his family, a Millers-
ville, Pennsylvania, pastor has resumed his
old occupation of blacksmithing.

"Before I began to preach," said Mr.
Bachman, "I was a blacksmith, the son of a
blacksmith, and I know what a blacksmith
can earn. I have eleven mouths to feed in
my family, and I was obliged to change
my occupation because I can't feed eleven
people and send my children to school on
preacher's pay.

"The hungry must be fed, the naked
must be clothed, the ignorant must be
educated, and so I am a blacksmith at least
for the present."

"I'm goin' to Panama," is the way Tom
greeted us the other morning. Upon
inquiry he told us that he was going to
work on Uncle Sam's big canal. "\$125 a
month and all expenses" is the way he put

it. Of course he had not advertised his
business for sale nor had he written to
Washington regarding a job on the Isthmus.
In fact he had come to his decision only the
evening before when he read an account of
the high wage being paid blacksmiths at
Panama. In the meantime Tom's shop
was closed and as we passed, we observed
several men inquiring of Mrs. Tom when
T. T. would return and when their work
would be done.

Electrical methods of tempering tools are
coming into use. The principle is an old
one, although its application is new. The
tempering is done, of course, by variation
of temperature and its success depends
upon the fact that heat generated by
electrical methods may be easily generated,
localized and controlled. In one process
the tool is plunged into a cold conducting
solution, thus completing an electric circuit.
Intense heat is generated at the surface
where the liquid and the solid touch, and
at the proper moment the steel is cooled by
interrupting the current, thus bringing the
low temperature of the liquid into play.
In another process the heat is generated by
an electric arc formed between the tool and
a carbon electrode similar to those used in
an ordinary arc light. These and similar
methods are believed by experts to be of
considerable value.

Jacob Riis, author, reformer and lecturer,
recently told a story of Patrick Mullen, the
Long Island blacksmith, who turned out
hand-made guns of such excellent work-
manship that they commanded the highest
prices.

"One day a man went to Patrick Mullen,"
said Mr. Riis, "and told him he had
worked long enough and that it was time
for him to rest. The man then told Mullen
that if Mullen would allow it, this man
would use Mullen's stamp on a gun not
made by Mullen and pay Mullen \$50 for the
use of the stamp on every gun turned out.
Mullen listened patiently, then he took the
man by the neck and a convenient portion
of his trousers and threw him into the
middle of the road.

"Mullen wouldn't lend his honor to such
a fraud. He was an Irishman by birth, and
he was a true American citizen. His honor
wasn't for sale."

Fifty-three years ago, with a capital of \$68
and a few tools, the Studebakers opened a
small shop for the shoeing of horses and
repair work. Today their plant covers
over a hundred acres. The first year, the
Studebakers made two wagons. Their
annual capacity now is one hundred thou-
sand vehicles. The secret of this phenom-
enal growth may be summed up in five
words: honesty, industry, intelligence,
energy, enterprise.

The biggest wagon and carriage factory
in the world is that of the Studebaker
Brothers Manufacturing Company. It
takes on an average a train of freight cars
each working day of the year for the trans-
portation of the factory's products, while
fully five thousand dealers in all parts of the
United States sell the Studebaker wagons,
carriages, and harnesses, and the factory's
output is represented in every civilized
country on earth. And all this in fifty-
three years. What an incentive to the
craft.

American Association of Blacksmiths and Horseshoers.

Smiths throughout the country agree that there is plenty of room for improvement in the present state of craft affairs. In some localities, however, our blacksmith friends do not seem to be alive to the attending opportunities, which if taken advantage of would do much towards raising the standard of the craft. We refer principally to the formation of blacksmith associations for the general good and welfare of the craft, and the excellent work which is being accomplished by societies of this kind is of vital interest to every up-to-date smith and progressive craftsman.

A movement for better prices of smith work would be heartily received by the members of the craft in every locality and is but one of the far-reaching beneficial results of organization. The American Association, with the co-operation of the American Blacksmith, is endeavoring to form organizations of this kind throughout the country and in view of the unlimited advantages thus offered to the craftsmen, every one should be willing to support the movement and lend us his valuable influence. If there is a blacksmith association in your vicinity, join it without hesitation. If there is not—address P. O. Box 974, Buffalo, N. Y., for plans of formation and we will tell you how easily one can be started. The American Association wants an able advocate in every county. Any progressive blacksmith in good standing will be given the authority to act as organizer of a branch association by addressing the secretary at Buffalo. In a good many cases the smith is in hearty sympathy with a movement of this kind but for some unknown reason neglects to express his views on the subject. The smith should not be afraid to come forward and demand his rights. Other branches of trade are protected, why should not the smith be given just recognition? We ask our friends to write us if interested so that we can start the ball rolling in their particular vicinity.

Forging Collars and Bands From the Solid.

C. H. RICHARDSON.

The method explained here is much easier than the usual way of turning and welding bar-stock, and when completed, will insure a higher percentage of perfect work than the old way.

Apparently the most confusing part of the plan here spoken of is to estimate the amount of material required to make the ring. The simplest way I have found after at least five years'

experience in this particular line, is to think of the band made of bar stock, then figure the circumference in the usual way, that is, diameter times $3\frac{1}{2}$ equals circumference. Then multiply this product by the area of the cross section of the bar the ring would be made from. This combined product is the volume of iron that is required to make the band from the solid. If it is required to know what the ring will weigh, multiply the volume in inches by 28-100, the weight of one cubic inch of iron. I mention this as a convenient formula for use when estimating on any iron forgings.

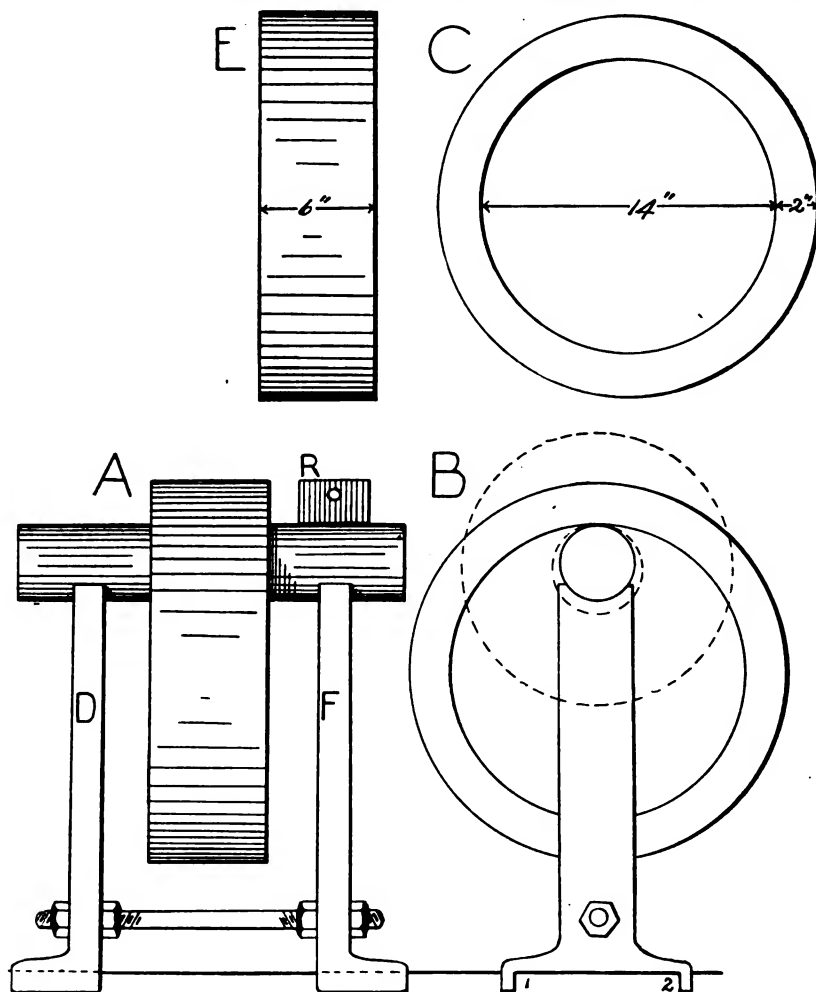
Weight or Mass=Volume x density.

Density=Mass or Weight÷Volume.

The accompanying engravings, E and C, show a plain ring or band 14 inches in diameter, two inches thick and six inches wide. What we want to know is the volume of this ring. Using the

volume of iron that is required to make this ring or band.

Having the data required, our next consideration should be given to our hammer. The stroke should be known, that is, how long a piece could be placed under the hammer and still leave room for a good effective blow. The object in knowing this, is to cut down the time wasted in heating large pieces of material. My greatest trouble when estimating on work is with the heating time. I find that 75% of the time is lost in this way. My way to overcome this great loss is to have the best tools the shop can afford. Besides these, it is necessary to have plenty of good superheated steam; a saturated pressure is not good enough for hammer purposes, it being almost condensed by the time it is at the hammer, and last but not least a good blast. I have never seen a forge with too much blast. The average do



THE FORGING OF A SEAMLESS BAND OR COLLAR.

formula we have, $14+2$ (the thickness of the iron)—16 inches, or the diameter from center to center of stock. $16 \times 3\frac{1}{2} = 50\frac{1}{2}$ inches, or the circumference of the ring. Now we multiply this by the area of the cross section of the ring; $50\frac{1}{2} \times 6 \times 2 = 603$ cubic inches, or the

not have enough pressure to force the slag clear of the outlet or tuyere.

Having the stroke of the hammer, we now select a piece of stock which contains 603 cubic inches plus five cubic inches. This allowance is for waste in heating and scaling, and is small to

insure rapid heating. This band should be forged in two heats. With the first heat cut the ends square, stand the piece on end and drive the stock down to the thickness of the band. Then with a two-inch punch, punch a hole through the disc. Next, pin out the hole to the size of the tool steel mandrel that rests on top of the hammer saddle as shown in the engraving. Now reheat the washer and place it on the mandrel as at A and B, drawing it to required thickness and diameter. It is a great help to have a guide as shown at R beside the band when drawing it. It aids in making the ring of a uniform thickness throughout.

The hammer saddle as it appears to

prise one order for the same class of engines, speed is a consideration of some importance naturally tending to the adoption of the quicker rather than what many might consider the better method of construction.

In the engraving, Fig. 1 A represents a frame of the 42-inch wide class, weighing anywhere from 300 to 600 pounds. It is made of good rolled bar iron, one end and the sides being of $3\frac{1}{2}$ by $2\frac{1}{4}$ -inch stock, the other end is of heavier iron, 4 by $2\frac{1}{4}$. As there is no machine finish on this frame, except at the corners where boiler plates lap, it is of first importance to have the iron for the sides and ends straight and out of twist. Neglect of this at the outset will cause

side scarfs. The side of the frame is scarfed by spreading the stock well with the sledges as shown at G. With a good initial heat, followed by two good side heats, a reasonably substantial job is secured. When the four legs have been welded on in this way, the frame is scarfed and welded in the middle by either of the scarfs shown at A. Appliances for handling the frames were shown in the March number of THE AMERICAN BLACKSMITH.

Where a large number of frames of this kind are to be made, this method proves very rapid, although many will question its reliability. The writer has seen made, and has himself made a large number of frames in this way with the consciousness that good results are obtained when the welding is expertly and conscientiously done. If not made in this manner it matters little what method is followed.

Welding of this kind, where the welded surfaces are left practically "black," can be made strong and reliable. Not so, however, if the entire frame is finished at the machine, as is sometimes done in railroad shops where a fire box frame has to be made only occasionally. In this case the sides of the frame are often forged with projections on the ends and scarfed and welded as shown at H, Fig. 2. If the sides are to be forged at all it would be better to do so as at K, Fig. 2. This shows the half frame forged in the solid; both ends being bent as per dotted lines. But without proper dies for bending under the steam hammer, this method would prove slow and laborious; however, it would undoubtedly produce the strongest and most reliable corner.

Another method is to forge the ends of the frame in one piece, as at X, Fig. 2, leaving projections on them, so as to weld easily to the sides. In some of the large locomotive shops these corners are upset in heavy forging machines. But the upsetting or crushing of the iron at such a vital part as the corner of a frame does not produce a superior job. In some cases the ends of the frame are furnished in cast steel. In each case the parts are braced together and welded with the X plug, as at Y, or the male and female scarf shown at Z. This is probably the only practical way of putting the modern heavy frames together. However, a superior job might be secured by forging the ends in the same manner as shown at K. This would ensure uniform direction of the grain and would carry the weld farther away from

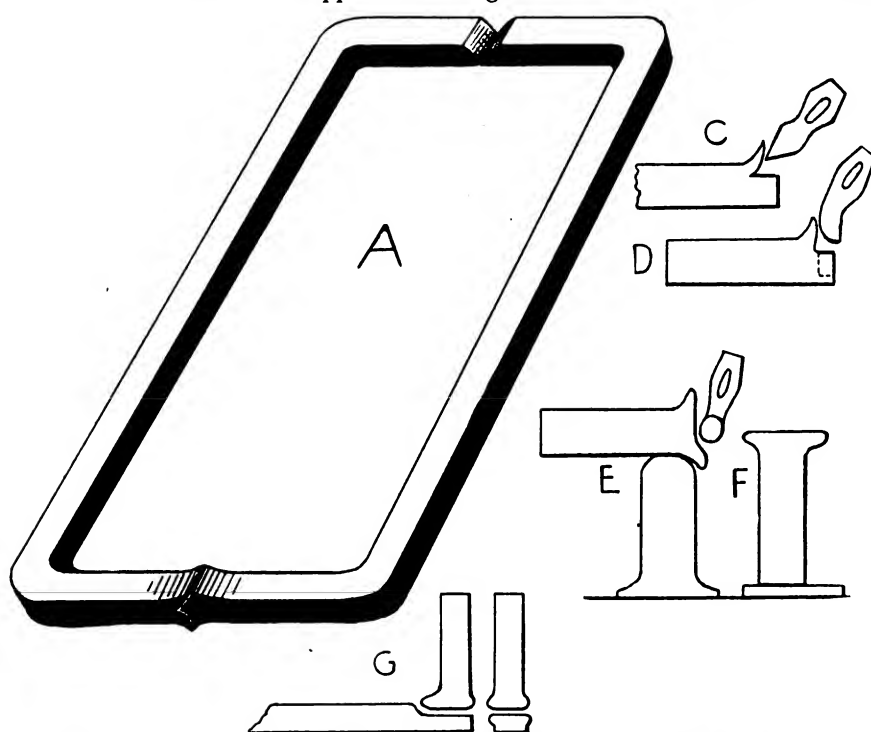


Fig. 1.—SHOWING FIRE BOX FRAME AND VARIOUS STEPS IN FORGING LEGS FOR FRAMES.

one when standing in front of the hammer, is shown at A. B is the side view and the dotted lines show how the band looks when first placed on the mandrel.

The legs D, E are flanged as shown at X and Y Fig. B to steady and prevent the sliding of the die while working and they are hollowed out on the top like a swage to hold the mandrel. The bolt through the legs is to prevent their sliding sideways.

The Making of Locomotive Fire Box Frames.

W. B. REID.

The method of making a locomotive fire box frame, or mudring, will doubtless vary according to its weight, the facilities for doing the work and the individual ideas as to the standard of practical requirement. In the contract shop where from five to fifty may com-

much trouble afterwards in keeping the frame square and level. The frame being made in halves involves the welding on of four ends or legs, F, Fig. 1. The method of scarfing the legs is shown at C, D, E, F, Fig. 1. C shows the iron cut into with the flat chisel and driven back with a V-shaped fuller to increase the stock at this point; D shows the iron cut downward with a gouge or round chisel, as shown by the dotted lines. This leaves about one inch stub at the bottom. This stub is then turned down over the anvil with the fuller to form the substantial toe scarf, as shown at E. The piece is then turned up on end on a block set in the floor and bevelled with the sledge, see F. The object in using the gouge as shown at D, is to hollow the center, thus leaving the stock full at the sides to spread into the

the corner of the frame. More care in this detail would prevent much trouble with leaky mudring corners as at present experienced in the wide, heavy class of boilers in railroad service.

How to Put on a New Lay.

A. GAUVAIN.

Fit the landside point properly, so that it will stand level on the bottom and landside: Fit it larger than the old one, so as to take up wear on the under-

heat, which I always take at the heel. Weld down to the point and then turn under and weld. When complete, heat the heel of the lay again and slip it on the plow, driving two slim taper punches in the first two holes, thus drawing the plow in to proper position. A few blows with the hammer will fit it properly. Now lay the straight edge on and see if it is level. If too low, a few blows on the point will upset the landside and

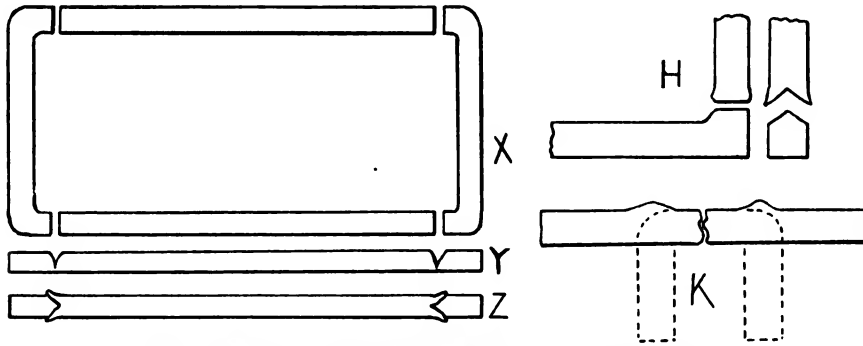
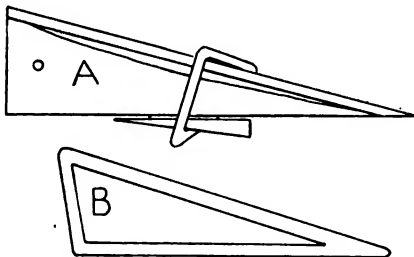


FIG. 2.—SHOWING VARIOUS METHODS USED FOR WELDING FRAMES.

side and to allow for squashing on the top side when taking the welding heat. Curve the point up, so the lay will rest firmly on the heel and point. See A in engraving. Now drill a hole in the landside point, giving it a little draw and bolt it on the plow. Now fit the lay to the plow and landside. The better you fit the landside and lay the easier the balance of work will be. Now mark the holes to be in the lay and drill, ream and square them, giving plenty of draw to the hole near the throat. Now bolt this on the plow in the proper position, so the lay and the landside will fit nicely, leaving about $\frac{1}{8}$ of an inch between them at the center of the landside point. This is so when you apply the clamp it will draw and hold firmly and when the first heat is taken it will work better and not spring. Next, make a triangle $2\frac{1}{2}$ by 6 inches of $\frac{1}{2}$ -inch square mild steel. See B in the engraving. Slip the triangle over the point of the plow, leaving the long end rest on the sharp edge of the



TRIANGLE AND METHOD OF USING ON PLOW LAY.

lay. Make a rough wedge and drive it between the triangle and the landside point, thereby holding the point and the lay firmly together. Take out the bolts and you are ready for the first welding

lower the point of the lay. I leave walking plows level on the bottom and give riding plows about $\frac{1}{4}$ -inch suction. I use No. 2 Star lays and points, as they are very good for this locality.

If hard lays are required, use soft center steel. Heat to a low, even red and dip the edge first in a large tub containing soft water and plenty of salt to keep it from getting too hard. Prepare some clay, kneading it to a stiff consistency, shove the edge of lay in it for a second or two so it will cool a little and then immerse in the bath. Take the lay out before thoroughly cool, and if sprung it can be immediately straightened. If you leave it cool entirely, it can not be straightened, but will break. I never had good success in sharpening crucible lays, but have with soft center lays. When fitting the landside point, bevel so the lay will touch evenly. This will insure a stronger and better weld.

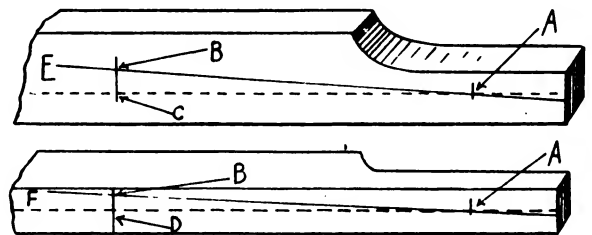
To square the holes for bolts, I make a square punch of the proper size and temper, heat the lay at the holes to a dark blue and then punch. At that heat it will shear out easily and make a nice job. The landside point and edge of lay is seen at A in the engraving, showing the distance to be left in the center and also the triangle in position with the wedge and the slip under the wedge to make it hold better. The triangle clamp alone is shown at B. This clamp is easily made, and is very handy in putting a new lay on a plow. If any

other member of the craft is using a clamp of this kind we would be pleased to hear about it.

Power in the Blacksmith Shop.

A. M. SPEER.

A poor engine is very likely to discourage a man and have him do without power. I say to my brother smiths, buy a good engine the first time. If it costs more than you expected, do without something else, but buy a good engine. I got one, but looked only at the price. It would not start until it got ready and no one could tell when that was going to be. It would stop when you wanted it to go, and what is more aggravating than trying to start an engine when customers are waiting and you can't tell when it will start? Many a time I did my work by hand, until I had time to start the engine. I got another. I was three days setting it up and two days trying to start it. I tore it up and sent it back. Then I got one from Watkins of Cincinnati. It started the first attempt. I have had it over two years and have never seen it refuse to start and run until some one stopped it. Of course this encouraged me, so I got a band saw, a drill press, an emery wheel, a ventilation fan, a forge fan large enough for four fires and a trip



LAYING OUT AND PUTTING IN A NEW WOODEN AXLE.

hammer made by Mayer Bros., Mankato, Minn. It is the easiest and best machine I ever had in my shop and works with a friction pulley and bale around the block. A man can control it to hit hard or easy and fast or slow. With ten cents' worth of gas I can blow the fire, drill, hammer, grind and run a fan to keep the sweat down.

Laying Out and Putting in a New Wooden Axle.

J. W. SMITH.

First I get the required length and cut the timber. I then draw a line in the center of the bottom and back lengthways. Then I take half the length of the box and make a mark across the center line as at A in the diagram. Then I take half the height of the wheel and mark as at B. Then laying my wheel down, dish up, I take a straight edge, lay it across as near the center as the hub will permit and with a rule, I get the exact dish of

the wheel which in an old wheel will vary from 1 to 2½ inches. Then on the back of the axle I measure up from the center line, the amount of dish as at C. Now marking from C to A, the line

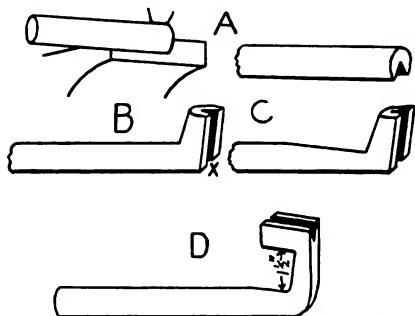


Fig. 1.—FORGING A PAIR OF HOLLOW BIT TONGS.

drawn will give me the center line of the spindle, which will make my bottom spokes exactly plumb, regardless of the dish of the wheel. For the bottom I take half the dish and measure back of the center lines as at D. Then proceed as before; this will give the right gather. I then dress down the timber by using lines E and F as centers, put on the spindles and I have a wagon that will run as good as new, regardless of the amount of dish. By using this method, you will get the best results, as there is no other way a man can make his wheels run right than by getting the axle set for the right amount of dish. I often make one end so that the opposite wheel will not run good, as some wheels have different dish even when on the same wagon and yet they are solid in the hub and rim.

Forging a Pair of Hollow Bit Tongs.

W. P. WOODSIDE.

A pair of hollow bit tongs can be made very easily without any helper if made by the following method. Soft steel ¾-inch round will make a pair heavy enough to hold 1½ or 1¾-inch square or round stock.

The first operation is shown at A, Fig. 1. This starts the groove. Next

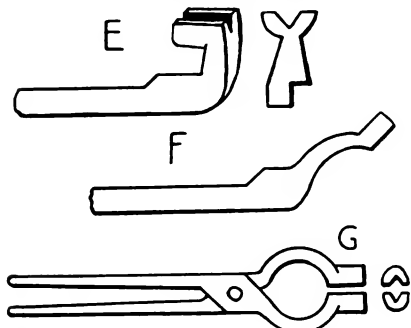


Fig. 2.—FORGING A PAIR OF HOLLOW BIT TONGS.

draw the material down a little just back of the groove and bend as at B. Hit your piece a couple of blows on the end

to square up the inside corners of the jaws X. Now draw the shank down as at C and then bend as shown at D. Now lay the piece over the outside edge of the anvil and forge the same as in making an ordinary pair of flat tongs. The pieces should look, when finished, as shown at E, Fig. 2. Now bend as at F and file, fit the jaws together and then drill the rivet hole. Now put a bolt in the rivet hole instead of a rivet, heat up the jaws and lay a piece of square stuff (the size you want the tongs to hold) in the jaws. If you have the jaws bent just right the inside corners will catch this square piece. If they don't fit the piece, bend them over the horn of the anvil until they do, then grip the square piece with them and fit down the outside ends and your tongs are done and will be of a nice shape. In bending the jaw as at D, Fig. 1, you can get the length so as to be able to make the other jaw match by measuring from inside to inside, as shown by the arrows. I allow 1½ inches for holding 1½ or 1¾-square or round stock, about 1¼ inches for ¾ or one-inch and about one inch for ¾ or ½-inch stock. I prefer the square V shaped jaws, as they hold square stock better than the round shaped jaws. The square jaw also holds round material to perfection.

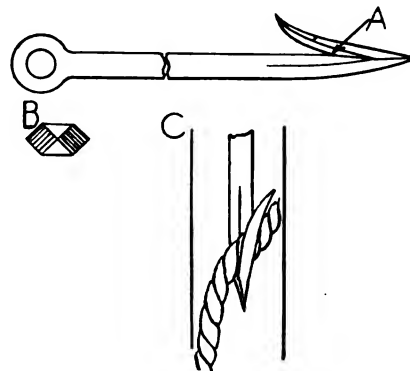
A Spear for Catching Broken Rope in Drill Hole.

LLEWELL R. SWARTZ.

Use one-inch square stock eight or nine feet long. Round up close and weld the eye in such a manner as to just

the hole. It depends upon the twist of rope as to whether a right or left bend should be made. Often it will do without a side set. Make the tool so it will just pass the rope in the hole. For instance for 1½-inch rope in a 5½-inch hole a spear 3½ or four inches wide at point of beard is about right.

The accompanying illustration C



A SPEAR FOR CATCHING ROPE.

shows the working of the tool and if well made it will work on wire as well as on hemp rope. This tool is easily and quickly made and does the work as well as the more expensive and cumbersome spears of the tool company's make.

How to Tell the Age of the Horse.

W. O. B.

The only method of accurately determining the age of a horse is by referring to the teeth, and as it would often be of value to the smith to be able to determine the age of the animals brought to his shop, he will do well to make an effort to study the various changes that

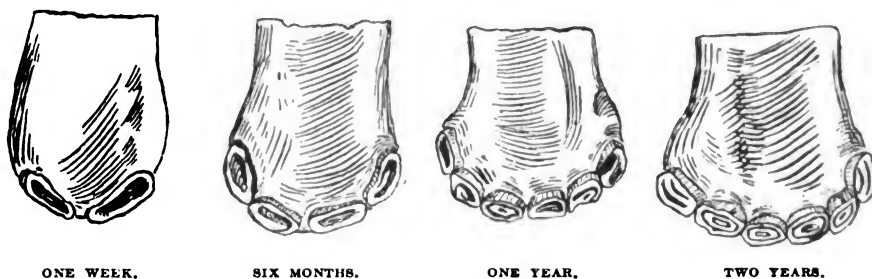


Fig. 1.—HOW TO TELL THE AGE OF THE HORSE.

admit the rope and not cut when fastened to pull the broken rope and tools from the hole.

If not convenient to use square bar for the whole tool, use square stock for making the lower or spear end and turn the beard or hook of the spear in such a manner as to present the corners of stock to each other. B shows a cross section of the spear head at A to illustrate this. Being made in this way the tool easily catches the rope and does not slip when it takes hold. The point of the beard should be turned a little to one side to make it take to the coil of rope in

take place in the horse's mouth from birth to old age. Although authorities differ slightly as to the exact size and shape of the teeth at a given age and it is a fact that all horses' teeth are not in the same condition at a stated age, the following is considered a fairly accurate guide for determining the age of the noble animal. As the back teeth are rarely studied in observing the various changes that determine the age of the horse, the mutations taking place in the nippers or front teeth only will be considered. One week after birth the two central nippers are seen.

Within six months two more teeth appear; one on each side of the first two. At the end of one year the colt will have cut his entire set of front teeth, six in each jaw. After the age of two years the only observable difference in the condition of the teeth is in the wear.

every way with no distinct point being now apparent. The gums will now begin to recede and run to a sharp point between the teeth and as the mark has been entirely obliterated from the teeth the only indication to serve as a guide is the relative recession of the

some time to come. The shoer can often assist a customer to purchase an animal and should become expert in telling an animal's age.

A Well Equipped Illinois Shop for General Work.

REISINGER BROS. & DOULEN.

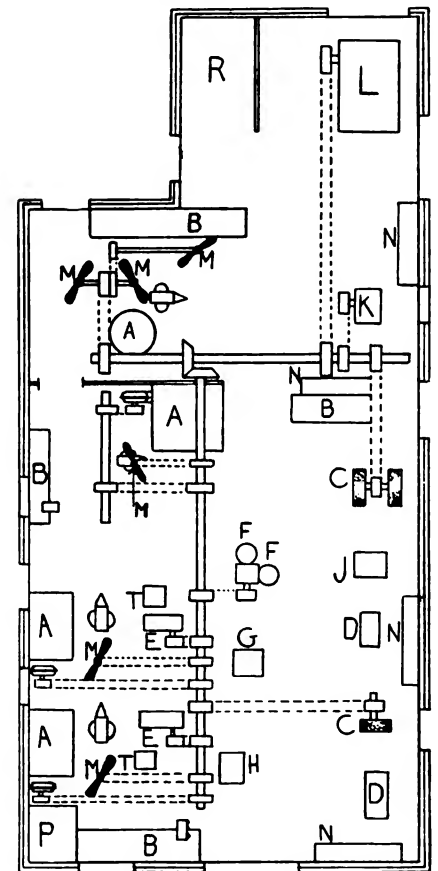
The accompanying diagram shows the a rangment of our shop. The blacksmith shop is 25 feet by 40 feet. The wood work shop is 25 feet by 22 feet and the boiler and engine room is 16 feet square. A. Forges. B. Vises and benches. C. Emery stands. D. Tire shrinkers. E. Trip hammers. F. Drill presses. G. Punch. H. Plow patron and handle former. J. Moldboard press.



Fig. 2.—HOW TO TELL THE AGE OF THE HORSE.

At two years the black mark in the central nippers will be wide and very faint, that in the two teeth next the middle long, narrow and dark, while the mark in the corner ones is longest, darkest and narrowest. During the third year the second set of teeth begin to show, the "baby" teeth or first set of nippers falling out and being replaced by the permanent teeth between the ages of three and three and one-half years. At four years the central nippers of the permanent teeth will have gained their full development. At four and a half years or some time before the animal is five years old the tush appears. After the appearance of the tush the age of the animal is determined by the shape and appearance of the teeth and their position in the jaw. At the age of six the mark on the central nippers is almost obliterated and the tush is full grown, being nearly an inch long. The shape of the tush at this time is concave on the inside and convex outside, with the top somewhat curved and pointed. By the seventh year the mark on the teeth will be very slight, that on the central nippers having entirely disappeared while on the other teeth it is fast wearing away. The tush

gums each succeeding year. As in all things, practice only makes a man anything like perfect in determining the age of the horse. As explained before, the horse's gums will begin to recede at the age of eight years. The teeth will also gradually change from their oblong shape to triangular and they tend to grow directly outward instead of up and down, until at the age of twenty years, when they may be at such an angle as to make proper mastication impossible. Between the eighth and twentieth year the animal's age can only be determined by the position of the nippers in the jaw. If the teeth extend unnaturally it will be difficult to determine the age. However, a person accustomed to handling horses will be able to make a fair estimate of the age of the animals passing through his hands by carefully following the rules set forth in the preceding paragraphs. In this connection it may be of value to the would-be professional to say that the presence of gray hair under the eyes and at the roots of the tail are also an indication of age. However, these marks are not as reliable as those of the teeth and jaws and should be considered only in connection with the



A WELL EQUIPPED ILLINOIS SHOP.

K. Feed mill. L. Engine and boiler. M. Fans overhead. N. Bolt cases. P. Desk. R. Coal bin. T. Leveling blocks.

We have a 13 horse-power steam engine, do all kinds of repairing, but do not shoe horses. We run three forges, make new iron plows and harrows, also wood frame harrows.

Some of our prices are as follows:

12-inch iron plow complete.....	\$12.00
12-inch moldboard, from \$2.00 to....	4.25
Shares.....	2.00 to.... 3.75
Handles.....	2.00
3-section iron harrows.....	11.00
2-section wood frame harrows.....	7.50
Sharpening plow shares.....	\$0.10 to.... .20
Sharpening harrow teeth.....	.50 to.... 1.20
Pointing plow shares.....	.60 to.... .75
Setting wagon tires, per set.....	1.50

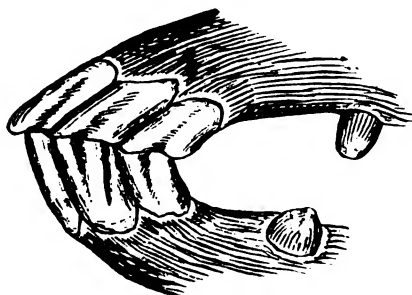


Fig. 3.—HOW TO TELL THE AGE OF THE HORSE.

is found to be gradually getting rounder. The outside is still round, but the inside is beginning to fill out and at eight years the tush is found to be quite round in

latter. The teeth have been regarded an index of age since time immemorial and the horse trader will continue to examine the mouth of his purchase for

Setting less than full set.....	\$.50
Setting buggy tires, each.....	.50
Wagon axles.....	2.50
Bolsters.....	1.50
Sand boards.....	1.00
Hounds.....	.50
Tongues, each.....	1.25
Spokes.....	.15
Felloes.....	.20
Grinding mower knives.....	.25
Grinding chilled plow lays.....	.25
Gumming saws.....	\$0.75 to 1.25
Other things in proportion.	

We also carry in stock pipe and pipe-fittings, lace leather, mower knives, mower and binder sections, rivets, bolts, buggy repairs, grain drill points and tubes, binder and mower knife heads and iron and steel of the sizes such as we use. We also keep a few plows, plow bottoms and harrows of our own make on hand so that if a customer calls for anything we can soon fit him out. In connection with the shop we also have a warehouse, 25 feet by 50 feet.

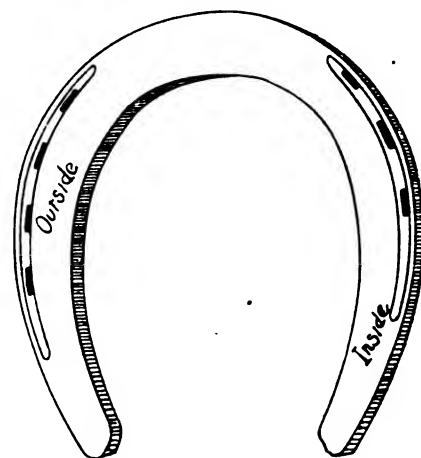
An Adjustable and Self-Centering Gauge for Fitting Wagon Hounds.

CARL YOUNGSTROM.

Did it ever puzzle you to fit a pair of hounds to a wagon tongue so as to have

seven inches towards each end and drill $\frac{1}{4}$ -inch holes at right angles to the big holes. At six inches from the center bore $\frac{1}{4}$ -inch hole in the same flange as the big hole. Now cut four pieces of iron of the thickness that is generally used for hound irons ($\frac{1}{8}$ -inch) and rivet them to the angle iron, one at each end at the last holes bored. Have counter-sunk holes in the small pieces so they can be brought up to the inside of the wagon hounds. The two 16-inch pieces are now ready. Now cut two pieces of band steel $1\frac{1}{2}$ by $\frac{1}{2}$ by 17 inches long and bore a $\frac{3}{16}$ -inch hole close to one end. One and one-half inches from the same end bore a hole big enough for a $\frac{1}{4}$ -inch bolt. At the other end make a slit about four inches long and wide enough to allow a $\frac{1}{4}$ -inch bolt to move freely in it. See B B in the engraving. Of the same size iron cut off two pieces eight inches long and two pieces 12 inches long and bore a $\frac{1}{4}$ -inch hole in one end of each of them and in the other ends bore a series of $\frac{1}{4}$ -inch holes about one-half inch apart. Be very careful that the

The pieces C C are placed in the same manner. It is very important when placing pieces D D and C C, that the bolts go through corresponding holes in the pairs or the gauge will not be true. The length of the straps depends on the width between the hounds, but the



RIGHT FRONT SHOE, GROUND SURFACE.

length here given was proved sufficient for every wagon that comes my way.

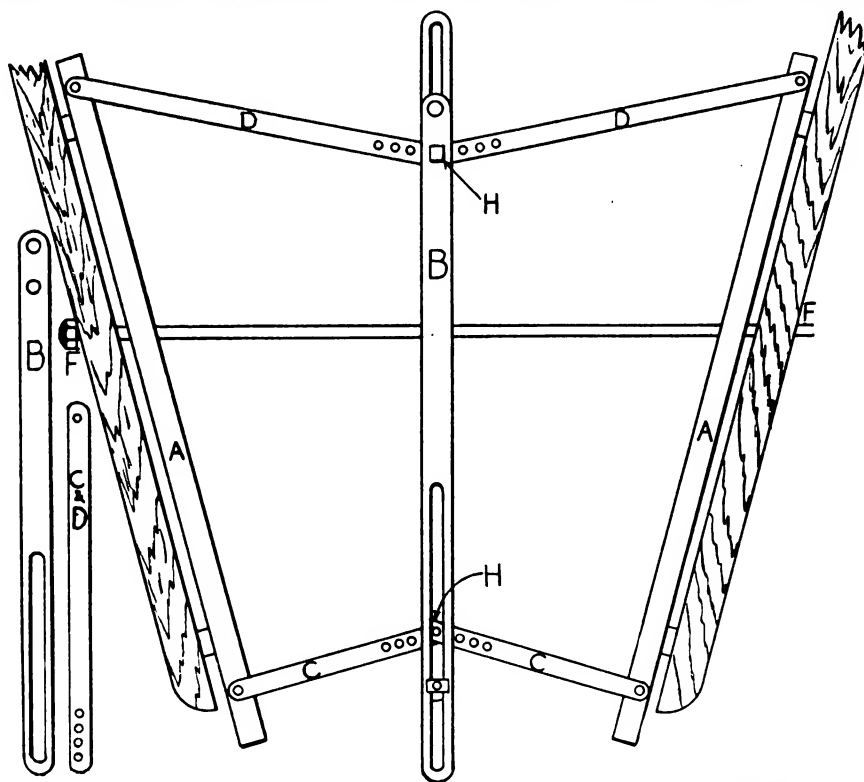
Now to use it, adjust the straps by putting the bolts H H through the holes which will admit the gauge to slip in easily between the wagon hounds. In drawing the bolts, press the bars B B against each other until A A fit up against the wagon hounds. Now lock the bolts H H, pull out the draw bolt F and push the gauge back so it is released. Now place the gauge on top of the wagon tongue and fasten it in the center of same with two woodscrews. Then turn the tongue over and fit the hounds. Mark the holes in the hounds before you take the gauge off, after which you need it no more for that job.

The Right Shoe on the Right Foot.

FRANK WENKE.

I have often observed that horse-shoers do not give enough attention to the right and left shoes on a horse. We use mostly machine-made shoes now, and in those there is no difference. But any observing blacksmith will find that as a rule the inner quarter of a horse's foot is straight and the outer quarter more curved. If the blacksmith shoes both feet alike, he will find in the first place that the shoes do not fit the outside circumference of the feet and must set the shoes back more or less and then has to rasp the toe off.

Another mistake is made with the nail holes. In the machine-made shoes we always find four nail holes on each side of the shoe and the blacksmith, more often than seldom, drives all eight nails. This is wrong, for on the inside we should never use the last nail towards the



AN ADJUSTABLE AND SELF-CENTERING GAUGE FOR FITTING WAGON HOUNDS.

a snug fit and both sides exactly alike? It puzzled me until I made the gauge here illustrated. It is adjustable, and at the same time self-centering. To make it, take a piece of $1\frac{1}{2}$ or $1\frac{1}{4}$ -inch angle steel, 32 inches long and cut it in the center. You then have two pieces 16 inches long. In the center of each, drill a $\frac{1}{4}$ -inch hole to admit the draw bolt F. From this center mark off

two pieces which constitute a pair are exactly alike or the centering arrangement will not be perfect. All the pieces are now ready to be assembled. Take the angle irons A A and rivet the pieces C C and D D to them as in the engraving. Take the two pieces B B and place them with the slitted ends in opposite directions, place the pieces D D between them and put in the bolt at H.

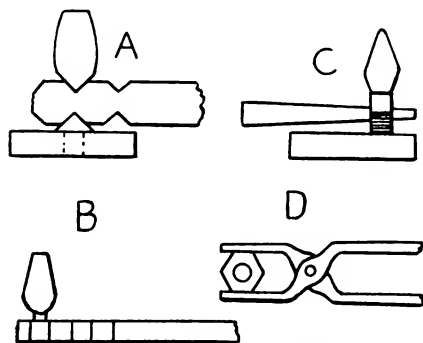
quarter. That quarter, being more straight than the outside one and the wall much thinner, will invariably contract if we put the last nail in, and there is also danger of pricking the horse. The foot should expand when the horse puts his weight on it, but it cannot do so if we put the nails too far back. I never use more than the first three nails on the inside and so give the inner quarter a chance to expand. The accompanying engraving shows the ground surface of a right front shoe and the way I prepare it. You will see that the last inside nail hole is not as far back as the outside one.

A good many blacksmiths are of the opinion that if the nails are not driven back in the quarter and all eight of them, the shoes will pull off. But by fitting my shoes nice and level all around, no daylight between the shoe and foot, and using only seven nails, I never have any trouble on this score.

Making Six-Sided Nuts.

M. KEPLINGER.

The following hint will be useful to the country smith, who is located far from town. It is to make a nut with six corners, as a country smith can not have every size of nut on hand. Take a piece of good iron the size the nut is to be. Then cut the nut. Do not cut from the flat side, but hold the iron on



MAKING SIX-SIDED NUTS.

the hardy as shown in the engraving. A shows the cutting, B the punching, C finishing to shape and D a pair of tongs to hold the nut which must be made thinner, as the nut two-eighths of an inch would be a little too thick. The pin should be from 16 to 18 inches long on which the smith finishes the nut. Good iron is necessary for the nut as poor iron would not stand the thread cutting.

The Causes and Treatment of Corns.

E. W. FERRIN.

Corns are so common to horses that do road or street work that fully 60% of such animals are affected in some stage of development. Every horseshoer has some practical experience with this

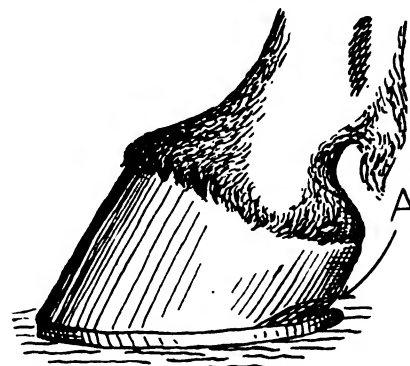
ailment of horses feet and it is so common that every horseshoer diagnoses a corn as soon as he sees it. But the cause and cure are not generally understood. Hence an article on this subject.

A corn consists of a bruise, a contused condition of the sensitive laminae, generally at the inside heel of the front foot; sometimes both heels are affected. The congested condition of the part affected causes the blood to ooze through the swollen tissues and stain the horn in the vicinity of the bruise. Thus the external appearance, the unerring symptom of corns, is a blood red stain at the heel of the foot. In aggravated cases the part becomes inflamed, there is some fever in the foot and pus may form, the presence of which is clearly indicated by acute lameness. If the pus is not given exit at the bottom it will find its way along the course of least resistance and break out up at the coronet over the seat of injury. There is prompt relief from the exit of this pus and usually rapid recovery follows, but if the cause be not removed there is no telling when the lameness may return.

There has been much speculation as to the causes of corns, and it has been usual to charge it to indifferent shoeing, but this cause has little to do with the case, as is proved by the fact that horses which work constantly on soft ground, even though indifferently shod, do not get corns. Therefore we must conclude that there is more in the nature of the work at which the horse is employed than in the shoeing. We see street horses shod by the most expert mechanics in America, yet they are troubled with corns, and on the other hand, we see farm stock shod by the farmer himself, not affected with this ailment.

The two principal factors in the production of corns are concussion and unequal distribution of weight over the proper bearing surface of the hoof. This suggests the question, what is the proper bearing surface of the hoof? The proper bearing surface of the hoof is the wall, the outer margin of the sole and the frog. In a natural state all of the above mentioned surface shares the weight of the animal, even the sole takes some little weight, for we invariably see the horse in the pasture with his feet packed with mud or clay, and so long as this mud is soft it has a beneficial effect on the hoof. In proving that the sole is not intended to bear as much weight as the wall, I would call your attention to the fact that the sole is concave, then again if the clay pack-

ing in the hoof be allowed to bake hard, it acts as a foreign body, bruising the sole. If it be admitted that the frog is properly a part of the bearing surface of the hoof, the ordinary method of shoeing (which imposes all the weight on the wall) is unscientific in that it deprives a part of the bearing surface (the frog) of its natural function, thus imposing upon the wall the weight that the frog would bear if allowed to do the work allotted to it by nature. This is



THE SHOE FITTED WITH BEARING OFF THE HEEL. A.

not the only ill effect of the absence of frog pressure. The frog is of rubber-like texture, and if allowed to come to the ground it does much to relieve the heels of concussion on hard streets. In the ordinary method of shoeing, especially when calks are used, the frog is entirely deprived of its natural function, hence the heels of the feet come to the ground on hard, unyielding pavements with a heavy blow at every step. It is this concussion, this constant pounding, together with the unequal distribution of weight that causes corns.

The treatment for corns is recommended as follows: When there is lameness the horse should rest, the shoe be removed and the foot poulticed with warm, wet bran, or soaked in warm water three times a day until the inflammation has subsided; if pus has already formed, cut down the heel of the hoof, wall and all, until the imprisoned matter is released. Keep the poultice on for a few days and the lameness will disappear, then the horse may be shod. Don't dig a hole down to the corn. I have frequently been told by the owner of a horse "To be sure and trim out the corns." The idea that digging out the blood-stained horn removes the corn is altogether erroneous; the blood-stained horn is merely an effect of the corn. The seat of injury is at the vascular structure, the sensitive laminae, and in digging a fissure in the angle of the bar, the seat of the corn, you encourage contraction. There is no excuse for paring down to the sensitive

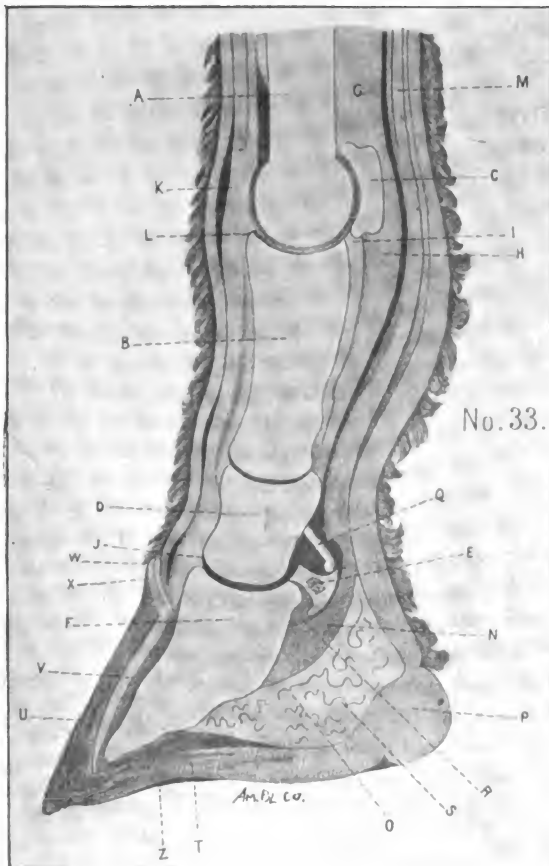
structure, unless for the purpose of giving exit to the pus. If you wish to remove the weight from the heel of the hoof, lower the heel, with the rasp.

Now, as to shoeing for the prevention of corns, anything that will lessen concussion is useful and anything that will equalize the weight is good, so with this object in view, shoe with bar shoes and leather soles, leaving the weight off the affected heel. As a prevention there is nothing to equal shoeing with a good rubber pad.

The Anatomy of the Horse's Foot.

Through the courtesy of Mr. M. L. Corbin, of Friendship, N. Y., a short sketch of whose life appeared in our columns a short time ago, we are enabled to reproduce a sectional view of a horse's foot. The horse-shoer who wishes to make a success of his craft will do well to study this diagram and also the general anatomy of the horse, thus enabling him to understand the nature of the disease or malformation of the animals brought to him for shoeing and treating.

For the reader's convenience the table



THE ANATOMY OF THE HORSE'S FOOT.

below corresponds to the letters in the engraving, which indicate the various parts of the horse's hoof:

- A. Shank-bone.
- B. Upper and larger pastern-bone.
- C. Sessamoid-bone.
- D. Lower or smaller pastern-bone.
- E. Navicular or shuttles-bone.
- F. Coffin-bone or bone of the foot.
- G. Suspensory ligament inserted into the sessamoid-bone.
- H. Continuation of the suspensory ligament inserted into the smaller pastern-bone.
- I. Small inelastic ligament tying down the sessamoid-bone to the larger pastern-bone.
- K. A long ligament reaching from the pastern-bone to the knee.
- L. Extensor tendon inserted into both the pasterns and the coffin-bone.
- M. Tendon of the perforating flexor inserted into the coffin-bone after having passed over the navicular-bone.
- N. Seat of navicular joint lameness.
- O. Inner or sensitive frog.
- P. Cleft of the horny frog.
- Q. A ligament uniting the navicular-bone to the smaller pastern.
- R. A ligament uniting the navicular-bone to the coffin-bone.
- S. Sensitive sole between the coffin-bone and the horny side.
- T. Hornyside.
- U. Crust or wall of the foot.
- V. Sensitive laminae to which the crust is attached.
- W. Coronary ring of the crust.
- X. The covering of the coronary ligament from which the crust is secreted.
- Z. Place of bleeding at the toe.

The Horse and the Automobile.

Since the automobile's coming much has been written and said of the passing of the horse, but so far, the horse has lost little of his ground in the commercial world

and although we see many automobiles used as pleasure vehicles, a proportion of them are owned and run by people who never had a horse. The



THE HORSE AND THE AUTOMOBILE.

horse is in little danger of losing his place, at least for some time to come. He is daily showing the world its inability to do without him and the incident pictured shows even the automobile's need of the animal.

The picture sent in by Mr. J. A. McLaughlin of Warden, Quebec, tells a story repeated daily in our larger cities and towns and is that of the broken down auto and the immediate need of the horse. The engraving shows the automobile of two enthusiasts who, having had a break-down while on a trip through the country, were obliged to call upon a farmer for aid. Of course the good man would allow them the use of his horse, but he was ashamed to be seen out with the machine so he sent his boys, who appear in the picture.

In this connection, does it not occur to you, Mr. Country Smith, that the need of your knowing about automobiles and their repair is immediate? It is an opportunity for profits of which you should take advantage.

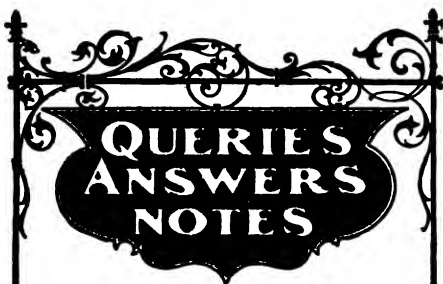


Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

When required to be cut into tool lengths, high speed steel should be first deeply nicked while hot. If nicked but slightly, cracks or slivers are likely to occur.

It is sometimes advisable to render glued joints waterproof, and to accomplish this a wood worker recommends the rubbing of chalk on the surface of the wood where the glue is to be applied and then glue in the ordinary manner.

It often becomes necessary to renew the surface of the oil stone, and if glazed but slightly, turpentine will be found effective. For a heavy glaze, however, rubbing with sandpaper will restore the surface. If the stone is gummed up and covered with dirt and oil, this can be removed by boiling the stone in a strong solution of lye.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Garden Rake and Dies.—Will some brother smith please tell me how to make a home-made garden rake? Also how to make leather and paper dies such as are used in cutting sole leather and paper? I must make some. JOHN R. THOMPSON.

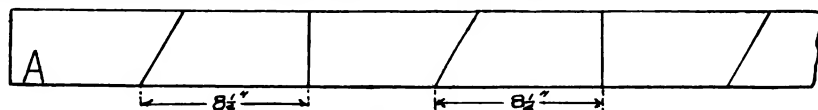
How to Soften Old Files.—I notice in THE AMERICAN BLACKSMITH a man calling for a way to soften old files. My way is to lay them on an armful of hard wood, set fire to the pile and leave the files until cold. This will soften them. PATRICK MAHER.

Questions for the Drill Smith.—I would like to receive instructions through THE AMERICAN BLACKSMITH on how to retool a six inch Z well drill. Where can I get suitable steel? What compound would be suitable for this purpose and what would a job like this be worth? H. H. MASSENGILL.

Oil Burning Tire Heater.—Kindly ask through the paper if any of your readers has a tire heater, burning coal oil or gasoline, that works good. I would like to know the builder's name and also if any brother smith can give me the plan of one so that I could build one myself. F. U. BRICKER.

Cutting Stock for a Ring.—In answer to Mr. John Padberg's question as to how long to cut stock for hands to fit 5 inches diameter would say, three times the diameter, three times the thickness of the stock and add $\frac{1}{2}$ inch to the foot. This rule will work, no matter what the diameter of the ring or thickness of stock. D. S. CROWE.

Erratum.—On page 154 of the May AMERICAN BLACKSMITH the engraving A,



HOW THE STEEL SHOULD BE LAID OUT.

Fig. 1, which accompanied Mr. W. P. Woodside's article on butcher knives, should have been marked as in the accompanying engraving. THE EDITORS.

Tire Rollers.—I would like to know which is the best tire roller made, barring all those adjusted by the end roller. Of all the rollers I have seen and used I prefer those adjustable with the center roller, leaving the outer rollers always the same distance apart no matter how small the tire. Perhaps some brother smith can give me some information on this point. O. G. MUHLIG.

Steel for Lathe Tools.—What kind of steel is best for lathe tools? A. R. S.

In Answer.—Lathe tools for ordinary work are of crucible steel containing 1.25 per cent. carbon. For turning very hard metals, use steel containing 1.40 to 1.60 per cent. carbon. When it is desirable to run at a very high rate of speed, use a self-hardening steel. T. A. B.

Double it Before '06.—I have canvassed all the blacksmiths in town and succeeded in landing two. I will keep at the others and probably will succeed later. If they only knew what valuable pointers they were missing every month, I would not have to ask them twice for their subscription. I hope that every brother smith who is now a subscriber will just hunt up one new subscriber. We can then double the circulation before '06. A. E. ROWCLIFFE.

A Mare that Cross-fires.—I have a pacer or a single footer, that cross-fires very badly. She is five years old, and has the appearance of being fast. She is shod with an eight-ounce plate in front and does her cross firing with no shoes on behind. Can some brother tell me how to shoe her behind and give his idea of a shoe? I would like to have this question discussed, as I often have cases of cross-firing. I like THE AMERICAN BLACKSMITH very much and could not do without it. W. H. C.

Gun Spring Tempering.—Draw the spring out with light heats to the shape you want it for use. Then heat to a cherry red and drop it into common machine oil. Now hold the spring in the flame until the oil catches fire and then hold in the air until the oil burns off. When cool the spring is ready for use. I don't lose one in a hundred by using this method. I often use a piece of good steel tire for making gun springs. C. P. LOWRANCE.

Welding Buggy Axles.—In welding buggy axles or other steel or iron bars, the ends of the laps are hard to weld, often making necessary two or more heats. I weld them with one heat. This is how I do it: Have a nice clean fire and scarf your piece roughly. Now take a nice clean heat and using powdered borax, weld in the center. Then quickly sprinkle powdered borax on the end of the lap and weld down with light hammer. Now turn the piece over and do the same on this side, catching the other end of the lap. THE ALEGATOR.

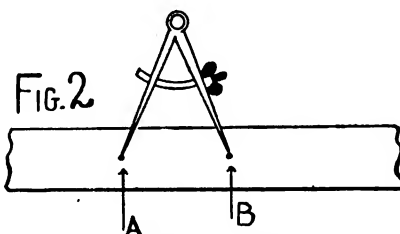
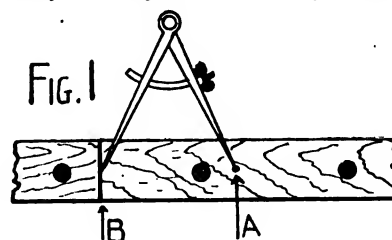
Fitting Shoes to the Foot.—I shoe horses and mules and set my shoes to fit the foot. With a rule which I always keep in my tool box I measure the breadth and length of the foot and also the heel, so as not to get the shoe too narrow. I then make the shoe 1-16 of an inch larger than the foot. Now measure the shoe from side to side, then hollow out the foot about 3-16 of an inch on the inside so the shoe will rest on the wall of the foot. You will not have

of them made this way breaking or losing their elasticity. GEORGE NABLO.

The Death of a Useful Association.—The Carriage, Harness and Associated Trades Guild of New York, a workman's mutual benefit association, after eighteen years of usefulness has voted to dissolve and divide its funds. Its membership has dwindled to about a dozen—too few for such an organization. Each member will receive about \$40. It has sent many of its members, chiefly smiths and wood workers, to all parts of the country. It has dispensed thousands of dollars in sick and funeral benefits. JOHN JONSEN.

That Tire Setting Question.—It seems to me that Mr. Craig, in his opinion of Mr. Van Dorin's method of tire setting, must be mistaken, for in Mr. Craig's method the tire must be heated after being measured, the same as in Mr. Van Dorin's and so must expand just the same.

I have used a method for a long time, similar to Mr. Van Dorin's, which is quite handy and may be of some help to some of



THAT TIRE SETTING QUESTION.

the brothers. I first make a mark on my wheel as at A in the illustration, Fig 1, and with the traveler start at this point and go around the wheel to B, Fig. 1. Then I make a pencil mark on the tire at A, Fig 2, and measure around the tire to B, Fig. 2. If you start at A, Fig. 2, and measure off the same distance on your tire that you have on your wheel, it will bring you to B, Fig. 2. Then take the dividers and measure from A to B and you will see how your tire and wheel correspond. With a center punch mark A and B and you are ready to take a your heat. This method is not reliable on thin tire, for when the tire gets hot its own weight is apt to kink it between the marks, but on a heavy tire it is much easier than running the tire with the traveler every little while. JOHN B. CAMPBELL.

To Cure a Toe-Crack.—I am shoeing a horse that has a very bad pair of front feet. They are split down the center of the foot from hair to toe. Will you kindly suggest a remedy for this defect? C. S. BEAVEN.

In Answer.—Drill a hole through the horn across the crack and close the latter by inserting a thin nail made of tough iron and clinch at both ends. The thing to be aimed at is to arrest all motion of the edges of the crack. This will prevent the new horn, which is constantly growing down, from cracking. If necessary two, three or more nails can be used as clamps, according to the length of the crack. When shoeing, lower the foot at the heels and pare at the toe, except just below the crack where the hoof should be pared until free from the shoe. T. A. B.

any trouble with limping horses if you follow this method. C. P. LOWRANCE.

Tempering Organ Pedal Springs.—In reply to Chas. B. Geiger as to tempering springs for organ pedals would say that I have made many, and all the tempering was done by hammering them when nearly cold and giving them the proper shape while being hammered. I forge them of old horseshoe teeth, making them wide at the base, where they are riveted together, narrow at the point and of an even thickness all along. I have never heard of any

An Interesting Letter from Kansas.—My secret of getting and keeping customers is to do the very best work possible, buy the best material possible and then charge for the work accordingly. If any customer complains that he can get his work done cheaper at some other shop, I tell him to go there, as that is what I would do if the work and material were as good as what I gave him. I built a power hammer last winter at a cash outlay of \$17.50. It weighs 61 pounds and running at fast speed makes 300 strokes per minute. I also bought a second hand 3½ horse-power gasoline engine for \$35.00 and repaired it at a cash outlay of \$4.50 and built all of my pulleys and hangers and this season has been the first that I could keep up with my work, with a helper. E. E. MERCER.

Calculating Horse Power.—Replying to T. W. W.'s query in regard to calculating the horse power of steam engines, I will say that the rule I usually follow is this: Multiply the area of the piston in square inches, by the average steam pressure in pounds per square inch and multiply this product by the travel of the piston in feet per minute, and divide this product by 33000. This will give you the Indicated Horse Power. The Net Horse Power is about seven-tenths of the Indicated Horse Power.

The point of stroke at which the steam is cut off in the cylinder makes a great difference in the average steam pressure in the cylinder, but according to indicator diagrams the steam pressure should never be calculated at more than ⅔ of the boiler pressure. In calculating problems of this kind, where the cut-off is not known, I generally use ½ of the boiler pressure. Thus the I. H. P. of T. W. W.'s engine would be a little over 22 and the N. H. P. would be about 16. JOHN B. CAMPBELL.

Some Prices From Nebraska.—I am running a shop here in Western Nebraska in the North Platt Irrigated District where the sun shines throughout most all the year. This town is a comparatively new one and the country has great prospects. I do not yet employ power to assist me, but should, as I have more work than I can do. Following is a partial list of our prices. In many things they are far better than Mr. T. Poinsett's of Missouri:

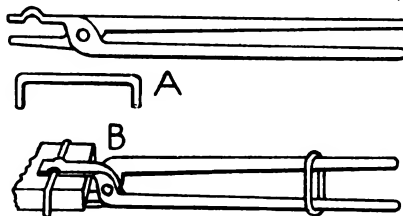
Shoeing, per set of two shoes.....	\$1.00
Resetting two shoes.....	.50
Welding buggy axles.....	.50 to 1.00
Resetting buggy tires.....	2.50
Resetting wagon tires.....	4.00
Pointing and sharpening plow shares.	1.00
Sharpening steel plow shares.....	.25 to .35
Welding buggy pole irons.....	.75
Putting in new buggy pole.....	3.25
Putting in new wagon pole.....	3.25
Putting in new wagon tongue.....	3.25
New plow lay.....	3.50 to 4.00
New spokes and fellos, each.....	.25
Others in proportion.	A. GAUVAIN.

That Tire Setting Question.—I notice in the May issue that Brother Craig differs in opinion with Brother Van Dorin's ideas in tire setting. I agree with Brother Van Dorin. It is as simple, quick and accurate a way as can be found. My father learned his trade from a northern man twenty years ago. He was hired and boarded by him and worked under him four years. He has been setting tires since that time with great success by simply using dividers.

I think the brothers will agree with Brother Van Dorin and myself in saying it is much less trouble to pick up your dividers than it is to lay your tire down and run it with the tire wheel every time you strike it a few blows. As for the heat there is in the tire (when you have got your dividers in both the prick marks), it will not alter the size of the tire. You can, however, unless the tire is a good deal larger than the wheel,

do this with the one heat and one running of the tire. I have only been working at blacksmithing and general repair work four years but have succeeded in every undertaking. I find THE AMERICAN BLACKSMITH a great help. F. MIDDLEBROOKS.

Tongs to Hold Wide Stock.—The accompanying illustration shows a pair of tongs which are convenient when one hasn't lip tongs at hand to handle wide stock. All that is necessary is to have a pair of long-jawed tongs, making the recess with a fuller and driving it down in a swage,



TONGS TO CLAMP WIDE STOCK.

making it as at A. Then take round stock and bend it at right angles to fit the stock to be handled. Now arrange the tongs and this bent piece as B, and clamp. This kink is nothing new, but perhaps some smith will find it so. J. C. LAMON.

Still More Upon Tire Setting.—I am a reader of THE AMERICAN BLACKSMITH and like the paper very much. I have got many good hints, each worth a year's subscription. The Queries, Answers, Notes department is very interesting.

Frank Short asks in the February number how to temper a square punch die and in the April number both W. T. Walsh and D. A. McDougall tell him how to temper the punch but say nothing about the die, which was the very question.

In the March number Van Dorin gives us a short cut in tire setting. His idea is correct under certain conditions. The measurement is right provided the tire is bent in a perfect circle between the marks A and D, but if the tire was flattened a little it would make the tire too short. He says the heat that gets into the tire expands it more or less and yet has no influence on this method of measuring. In the May number C. Craig wishes the opinion of somebody else on this question and it is on that request that I come in on the subject, although I think Van Dorin has something to say himself. C. C. says: "In Van Dorin's method we have to allow for two heats and in the old way we just allow for one." Where did the two heats come in? He seems not to understand Van Dorin, for he said: "When the tire is finished the points of the divider should stand in the marks A and D." Both Van Dorin and C. Craig seem troubled about the heat in the tire. When last measured, the tire will shrink, whatever method is used, and allowance made for that shrinking in either case. I think the old method is the safest and just as quick because there is time lost in the marking as well as in running the traveler. C. Y.

Random Remarks on the May Issue.—On page 144—Frank Wenke tells about his sideline, which is "doctoring horses, mules, cows and now and then a dog." He says, "Anyone may do it. The common ailments of our farm animals are easily treated. The treatment in most cases is nothing more than first aid to the injured and sick. Nature generally does the rest." With these last two statements I am ready to agree. I once heard a very wise man say that as a rule, the best that could be done for a sick animal was to give it a good letting alone. But how about the state-

ment "Anyone may do it?" It is generally thought that special talent is necessary for this kind of work. Some men are entirely unfitted by nature to attempt anything of the kind with any hope of success. There is no doubt that if the country blacksmith has a taste in the direction of veterinary work, he may make himself very useful in many emergencies, but I hope that before he allows himself to think he is capable of doing much in that line he will become better posted on the subject than the hero of the following true story:

Just one mile from where the writer spent his boyhood days, there lived an honest blacksmith who, besides running the shop at the "corners" made himself useful to the neighborhood by prescribing for sick horses, cows, etc. Whenever a farmer had a horse or mule that was "not doing well" he took him to the blacksmith, who knocked the corners off his teeth and let him "Chaw" a rasp for a while to make a good smooth job.

A neighbor one day found a fine young heifer in a very bad way. She was so stiff and lame in one shoulder that she could hardly move, and seemed to be very generally out of sorts. The blacksmith was at once sent for, and after a careful examination he pronounced the disease "hollow-horn" and calling for a brace and bit he bored a hole in each horn and poured it full of turpentine. The heifer died in a few hours of black-leg, as anyone who has ever seen a case of the disease would have known from the symptoms.

The writer who does the most for his fellow craftsmen is the one who tells exactly how he does a job without presuming that the other fellow knows it all, and who illustrates what he has to say by drawings. Under this class may be mentioned F. W. Price, who tells how to make the joints in a carriage seat; W. E. Gruber, who shows how to make a wedgeteater; and J. W. Lowry, who tells how he cuts up steel stock. His cutting chisel is all right. He says he cuts plow steel "cold or at least nearly so." This wording might be a little misleading to the beginner. Plow steel or any mild steel may be cut or sheared to the best advantage when it is just a little below a red heat than otherwise.

Page 150—The editor says: "Knock not thy neighbor—hammer on your own anvil and blow your own fire. How's that for a good blacksmith maxim?" That is all right. It reminded me of a little verse that is a part of my childhood memories. I do not remember who the author is, but here is the verse:

If you would drive away
Gloom; and would hie away
Honey-like peace in your innermost cell
Work like the humble bee
Soft let your grumble be
Burn your own smoke and the world
will go well.

Page 154—Mr. Woodside's article on "How to Make Butcher Knives" is well written and nicely illustrated. Mr. Woodside is another of those writers who know just how to give instructions so that an apprentice would have no trouble in following them. I would like to ask Mr. Woodside if he ever tried hardening only the cutting edge of the blade by heating the edge carefully in a slow fire and drawing it back and forth till the edge was red, then plunging it in the bath. In this way the back is left soft and it does not warp in the cooling.

"The Care of the Colt's Feet," by Mr. Perrin is good, sound advice; the only trouble is that the farmers or other colt owners are the people who ought to read and heed it. The horseshoer has a chance here to do some missionary work and should take advantage of it. J. M. DRZW.

SUPERIOR Horse Rasps

The Best Yet

Best High-grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim,
which gives the user the advantage of a long stroke,
and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

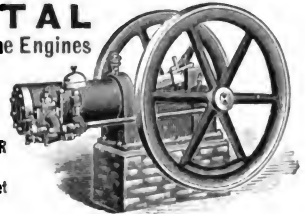
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Heave, Cough, Dis-
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and owners. Every drug-
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can get it.
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CAPITAL Gas & Gasoline Engines

We will sell a
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A wheel that will do the work
in one-fourth to one-half less
time is by far the cheapest
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that will save only one
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your busy season would
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POWERFUL AND STRONG,
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Vulcan Horse Nails
YOU CAN NEVER GO WRONG.

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THE QUALITY OF VULCAN
HORSE NAILS IS FULLY GUARANTEED

THE FOWLER NAIL CO.
SEYMOUR, CONN.
SOLE MANUFACTURERS



Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., June 26, 1905, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

1/4 in..	round or square; Iron,	\$2.80;	Steel,	\$2.90
3/8 in.,	" " " "	2.40	"	2.50
1/2 in.,	" " " "	2.20	"	2.30

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Blacksmith and Wagon Makers' Supplies,
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Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.

WESTERN AGT. FOR DITZLER COLORS IN JAPAN.

Write us your requirements.

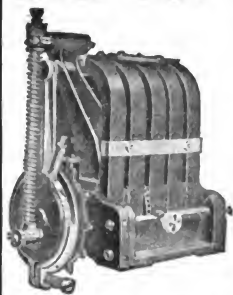
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F. M., Care of American Blacksmith, Buffalo, N. Y.

BLACKSMITH WANTED.—Good chance for an all-around country blacksmith. Good shop and dwelling, with garden, rent cheap. Address
HEBER CHASE & CO., Wady Petra, Ill.

FOR WELDING all kinds of cast iron and malleable iron. Can be used for welding all kinds of cog wheels or castings. For \$5.00 this receipt will be sent to not more than one smith in a town.
C. J. SMITH, Bondurant, Ia.

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W. M. OSTRANDER, 109 North American Bldg., Philada.

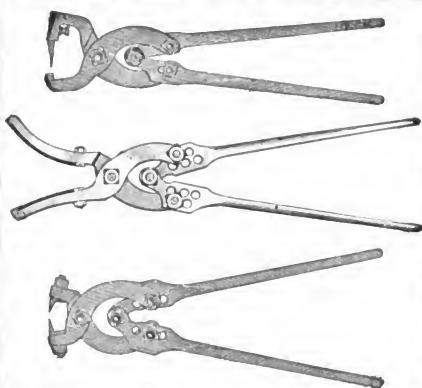
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Seventeen different grades of tops
All good ones.
Prices right.
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CASTERLIN'S TRIO OF SHOERS' TOOLS**ADJUSTABLE HOOF CUTTER**

founded on entirely new principles. Power and Knife, both adjustable. Shifted in a moment. Hundreds of testimonials say it's the best Hoof Cutter ever made.

DETACHABLE NAIL CLINCHER

does better and quicker work than can be done with hammer. No rasp required. Teeth are detachable and changed in a moment.

SAMPSON NAIL NIPPER

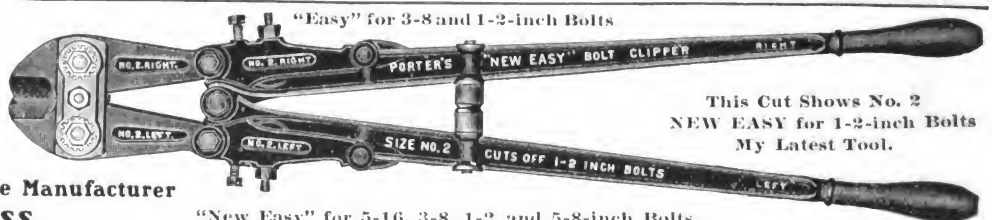
is the most powerful Nail Cutter ever invented; will cut off three nails at once with one hand. These tools are king among their kind and have come to stay.

Write for circular giving description and price.

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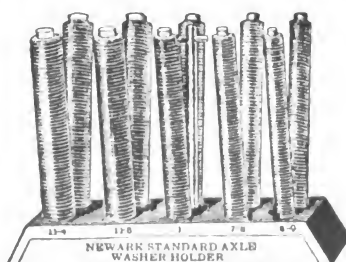
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NEW EASY for 1-2-inch Bolts
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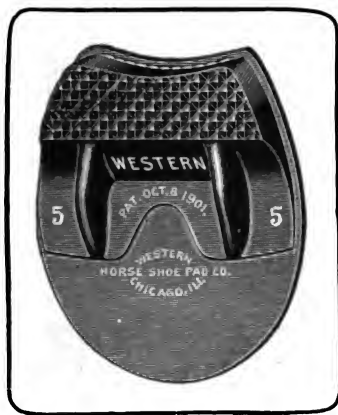
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Interchangeable thread—6 sizes.
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Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

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Now made
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Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

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They sell to all vehicle owners on sight. You can make a nice profit selling the Perfection to your customers, especially to livemen. **WRITE AT ONCE FOR SAMPLE.**

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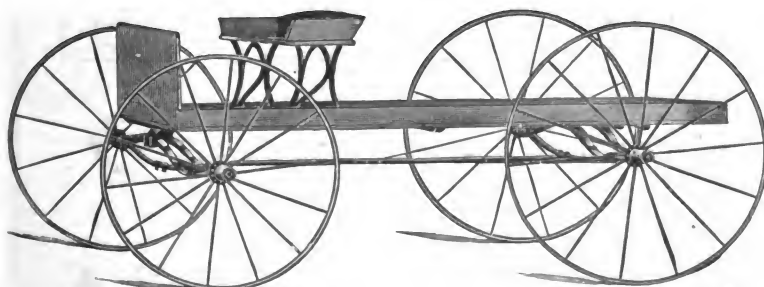
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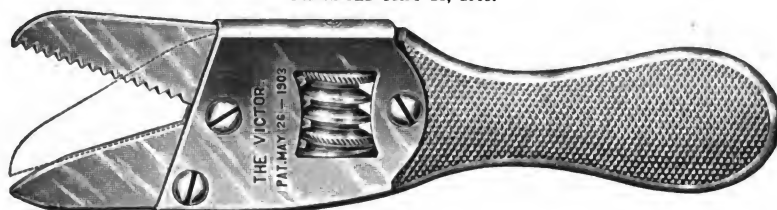
TIME SAVED IS MONEY IN YOUR POCKET

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ADJUSTABLE ALLIGATOR WRENCH

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IS A TIME AND MONEY SAVER

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Made in three sizes, full nickel plated,

7 in.	8 in.	10 in.
\$1.00	\$1.25	\$1.50

The 7 in. size is also made in dull black finish with polished jaws.

Extra Movable Jaws	7 in. .25	8 in. .35	10 in. .50 each.
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OUR 30 DAYS' FREE TRIAL OFFER

If your dealer does not handle the Victor Adjustable Alligator Wrench, we will send prepaid a 7 in. full nickel or black finish Victor Adjustable Alligator Wrench for

\$1.00

Test it 30 days. If not fully satisfied return it and get your money back.

Write for our special offer for club orders of 6 or 12 wrenches

ACME HARDWARE CO.

MANUFACTURERS OF HIGH GRADE TOOLS

35 LITTLETON AVENUE, NEWARK, N. J., U. S. A.

Columbian Hardware Co.

CLEVELAND, OHIO.

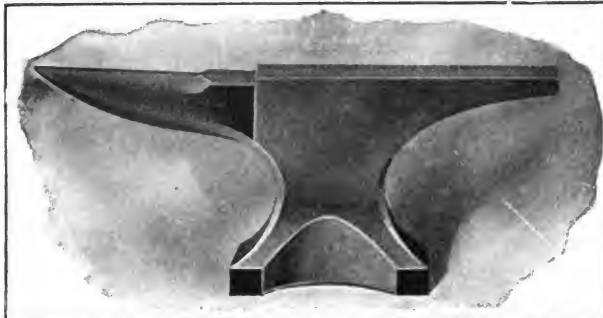
OUR ANVILS
are made of special ingot steel. Each one is protected by our written guarantee. Built to stand the test of long, severe service. Carefully constructed by the most skilled workmen. Their quality cannot be excelled.



OUR VISES
have jaws forged from one piece of special ingot steel and faced with high-grade crucible tool steel. Our horseshoers' vises are made to turn both calks at one heat on flat front jaw. Every vise carefully inspected before leaving factory.

COLUMBIAN ALL-STEEL ANVILS AND SOLID-BOX WROUGHT STEEL VISES
Are noted for their superior quality. Only first-class material and workmanship employed in their construction.

SEND FOR CATALOGUE



WRITE FOR PRICES

COLUMBIAN HARDWARE CO.,

CLEVELAND, OHIO.

"Tools That Wear"

HELLERS' CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



HELLER BROTHERS CO., Newark, N. J., U. S. A.

WHY NOT BUY A CHUCK

That will fit the spindle of your drill press, holding drills $\frac{1}{8}$ to $\frac{1}{2}$ in. inclusive, with reducer to $\frac{3}{4}$ in. Drills held by this chuck are much cheaper than drills with $\frac{1}{4}$ in. or $\frac{1}{2}$ in. shank. Simplest and cheapest chuck on the market.

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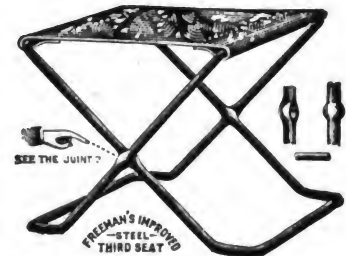


DETROIT TWIST DRILL CO.
228 21st Street, Detroit, Mich.

Let Us Send You Our Book.
about good wheels and good wagons that will save you a lot of work and make you a lot of money—the
ELECTRIC STEEL WHEELS
—and the—
ELECTRIC HANDY WAGON.
By every test, they are the best. More than one and a quarter millions sold. Spokes united to the hub. Can't work loose. A set of our wheels will make your old wagon new. Catalogue free.
ELECTRIC WHEEL CO., P. O. Box A Quincy, Ills.

ELECTRIC

FREEMAN'S Improved Steel Third Seat



Superior to all other third seats on the market. The frames are made of polished steel bars finished in black enamel. The joint is upset to double the size of the bar, which gives great additional strength and allows the use of a steel pin twice the length used in other steel seats. It is impossible for the joint to give out or the pin to break. See the cut. It can be used as a carriage third seat, camp chair, hassock or child's chair.

In order that you may satisfy yourself of the superior quality and genuine merit of the Freeman Folding Third Seat, we will be pleased to send you one sample seat by express, prepaid, upon receipt of 75c. in coin or stamps. At the same time, we will quote you our best dealers' price in quantities.

Geo. B. Freeman Mfg. Co.

93-97 14th Street,

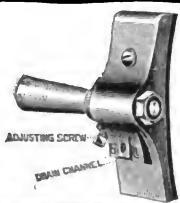
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High Pressure Brand No. 2 Brazing Forge



Patented February 7, 1900.
Will do all kinds of brazing, both light and heavy. It is fitted with three powerful improved Hydro Carbon Burners. Both Gasoline and Kerosene Machines in stock. Write for description.

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Potters Spring Brake Blocks

For Vehicles of all kinds with **STEEL OR RUBBER TIRE.**
Have a record of excellency for seventeen years. **• • •**

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SOLE MANUFACTURERS.

CATALOGUES.

FISHKILL ON HUDSON, N. Y.



Across
Lake Erie
Between
Twilight
and
Dawn

THE D. & B. Line Steamers Leave Detroit daily at 5:00 p. m. (central time) and Buffalo daily at 5:30 p. m. (eastern time), reaching their destination the next morning after a cool, comfortable night's rest en route. By special arrangement all classes of tickets reading via the Michigan Central, Wabash and Grand Trunk Railways, between Detroit and Buffalo, in either direction, are optional and will be accepted for transportation on the D. & B. Line.

Detroit & Buffalo Steamboat Co.

A. A. SCHANTZ,
Gen'l Supt. & Pass. Traf. Mgr.
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Wolfe's Cold Tire Setter

Patented

The most complete machine for the purpose on the market

Simple in construction, easily operated.
Quick adjustments, prompt results.
Takes a short hold or long one, as desired.
Grips the tire firmly, keeps it always in line.
Double acting, quick for light tire, powerful for heavy.
Dishing device with every machine.
No cold tire setter a success without it.
DO NOT BUY without investigating this.
The latest and best. Write for particulars.

HENDRICKS MFG. CO.

Manufacturers and Selling Agents, Wanesboro, Pa.

Less Work and More Money

A GUARANTEE MADE TO USERS OF

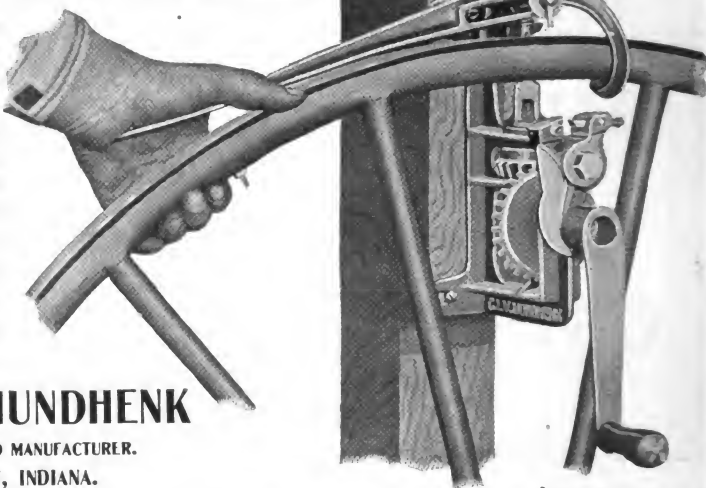
The Mundhenk Tire Bolting Machine

Mundhenk's Tire Bolter is the Only Machine that Will Successfully Remove all Burrs, Run Them On or Clip Ends off Tire Bolt Perfectly Smooth in 2 minutes' time.

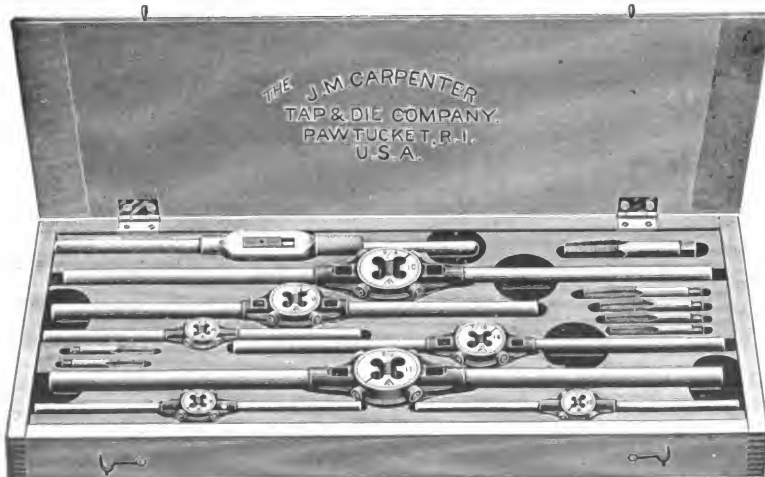
Send for one of our interesting circulars and let us tell you all about it.

C. L. V. MUNDHENK

INVENTOR AND MANUFACTURER.
MARION, INDIANA.



Easily operated. Made of Malleable Iron. Constructed to fit any size nut. A labor saving machine for up-to-date shops.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

Send for catalogue

The J. M. Carpenter Tap & Die Co.

Pawtucket, R. I., U. S. A.



Gold Medal Tire Upsetters

For durability, strength, ease of operation, adaptability, and capacity

The Highest Award--A Gold Medal

was given to Buffalo Goods at the World's Fair.

BUFFALO FORGE CO.
BUFFALO, N. Y.

In Canada:

The Canadian Buffalo Forge Co., Montreal.

Buffalo No. 90 Drill

with ball bearings where they belong—at the points of greatest wear and friction. It runs 50 per cent. easier than any drill of equal capacity on the market. Also built in smaller sizes. Send for catalogue.



**Buffalo
Tire Upsetter, No. 2**
Upsets
3x $\frac{3}{8}$ Tires or
1 $\frac{1}{2}$ inch axles

Built of armor plate and crucible steel. Nothing can wear out, break or get lost.

Self-adjusting grips. Non-kinking attachment toggle joint action.

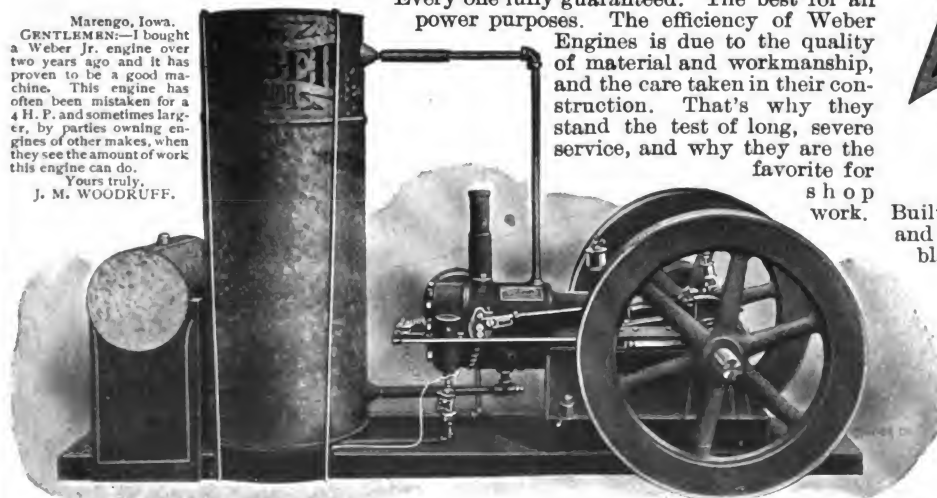
WEBER ENGINES

RECEIVED THE GOLD MEDAL AT THE
ST. LOUIS WORLD'S FAIR.



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GENTLEMEN—I bought a Weber Jr. engine over two years ago and it has proven to be a good machine. This engine has often been mistaken for a 4 H. P. and sometimes larger, by parties owning engines of other makes, when they see the amount of work this engine can do.
Yours truly,
J. M. WOODRUFF.

Every one fully guaranteed. The best for all power purposes. The efficiency of Weber Engines is due to the quality of material and workmanship, and the care taken in their construction. That's why they stand the test of long, severe service, and why they are the favorite for shop work.



Built from 2 $\frac{1}{2}$ to 300 H. P. Our 2 $\frac{1}{2}$ and 5 H. P. are especially adapted to blacksmith and repair shops. They are simple, durable and easy to operate. Carefully tested before leaving shop.

We agree to replace any parts found defective f. o. b. our works without cost, for a period of two years. WEBER ENGINES operate on one-tenth of one gallon of gasoline per H. P. per hour.

WEBER JUNIOR 2 $\frac{1}{2}$ H. P. Engine. It is shipped with all attachments complete, ready to run.

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WEBER GAS AND GASOLINE ENGINE CO.

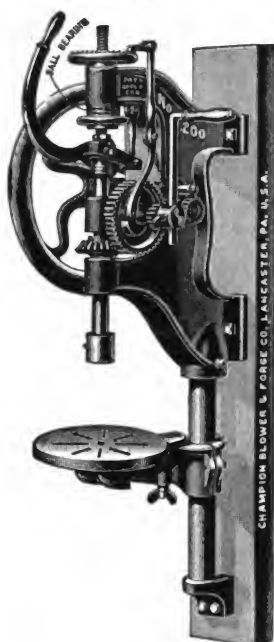
New York Offices, 115 Liberty St., N. Y. C.

KANSAS CITY, MO.

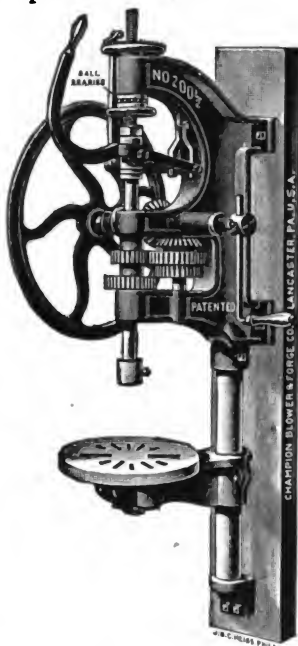
P. O. Box V. 1114

Champion "Patented" Combination Automatic Self-Feed and Lever-Feed Upright Post Drills

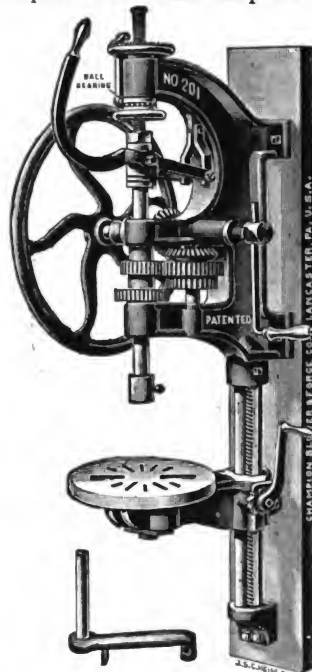
BLACKSMITHS : The Champion Combination Automatic Self-Feed and Lever-Feed Blacksmith Post Drills and Upright Drills shown on this page represent a complete line and the only Hand and Power Blacksmith Post Drills or Upright Drill ever built with Automatic Self-Feed and Lever-Feed combined. They give the blacksmith the benefit of a Hand Drill with swift-moving methods, which produce immediate results precisely like the highest priced and latest improved Machine Shop Power Drills costing ten times the price of these Drills.



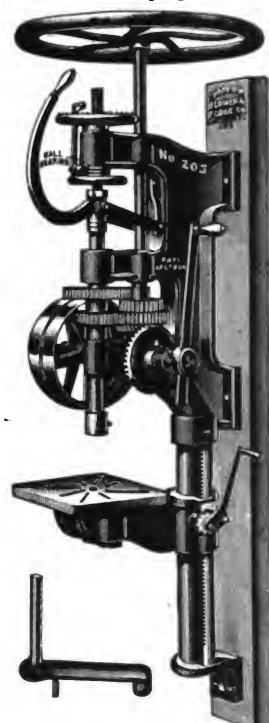
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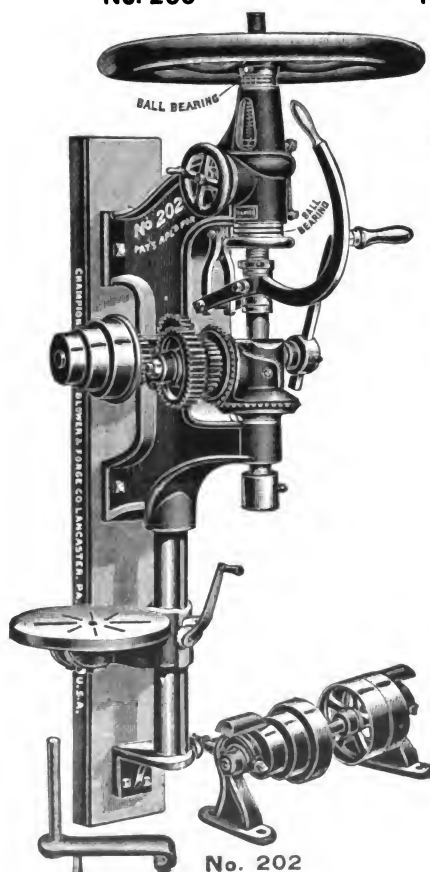
No. 200 1/2



No. 201



No. 203



No. 202

Combination Automatic Self-Feed and Lever-Feed Drills, Patent No. 767,282, August 9th, 1904.

With Either Lever-Feed or Automatic Self-Feed 95 PER CENT.

IN TIME and LABOR is saved by the INSTANTANEOUS RAISING of the Drill Bit out of the work.

50 PER CENT.

IN TIME and LABOR is saved by the use of the LEVER in drilling small holes, reaming, counter-sinking, etc. The LEVER-FEED makes it a capital WOOD-BORING machine for Blacksmiths. Either the LEVER-FEED or AUTOMATIC SELF-FEED is always ready for work. The feeds are changed from one to the other in a fraction of a second; therefore, are always ready for any kind of work to be done.

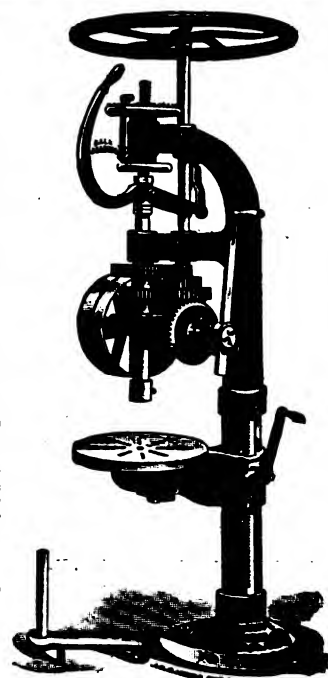
The Champion Combination LEVER-FEED and AUTOMATIC SELF-FEED Blacksmith Post Drills are the only Hand or Hand and Power Blacksmith Post Drills ever built with both

LEVER FEED AND SELF FEED.

They are not a mere improvement on hand drills. The invention is absolutely new and REVOLUTIONIZES the work of drilling in the Blacksmith Shop to the extent of reducing the TIME and LABOR in drilling metal by hand, in many instances, to more than one-half; in other words, they give a Blacksmith the benefit of a hand or hand and power drill equal in every respect to the latest improved and highest priced Power Drills used in machine shops.

Write for our 1905 Catalogue, showing the largest, most up-to-date and most complete line of Blowers, Forges, Drills, Tire Shrinkers, and Benders, Screw Plates, Power Blowers, etc., ever manufactured. To prove our statement allow us to send you our 1905 catalogue, which is sent free to all those asking for it.

**Champion Blower
& Forge Co.
Lancaster, Pa., U. S. A.**



No. 203 1/2

THE WORLD'S
PRIZE WINNER

Ask the Man Who Owns One

**Over 180,000
No. 400
Champion Steel
Blowers
and Steel Forges**

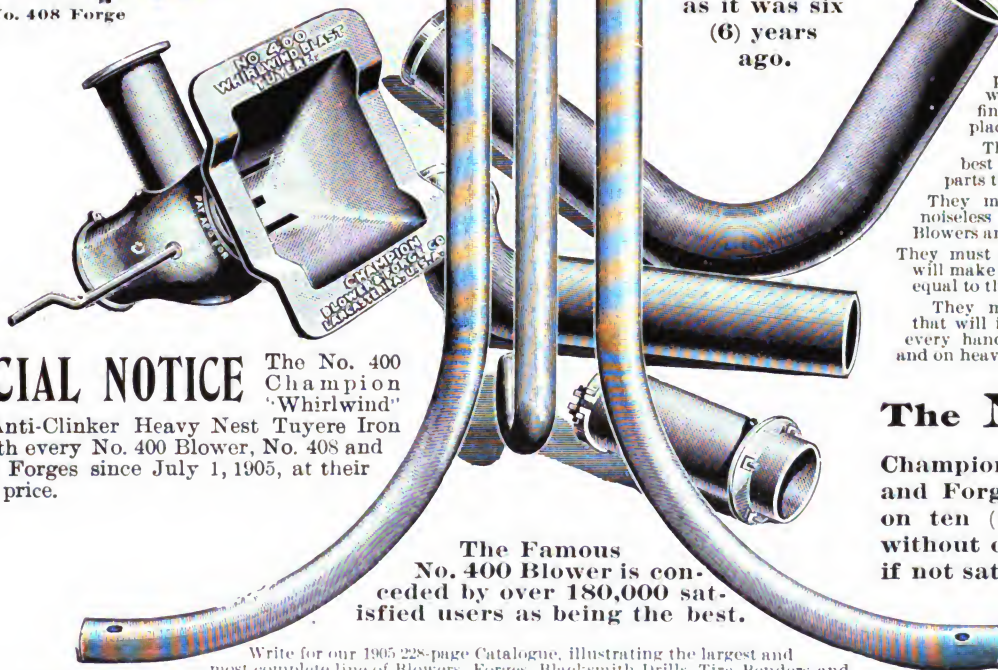
Have been manufactured by us
and placed in the hands of their
users in the last six (6) years.



No. 401 Rivet Forge



No. 408 Forge



IT'S ALL IN THE SPIRAL.

The U. S. Patents say no one has
the right to use it but us.

If you want to eliminate all element
of chance or uncertainty when
you buy a Blower, then

Buy the No. 400

Whenever you see the "No. 400" it's
a sure Guarantee of **QUALITY,**
PROFIT and **PLEASURE.**

GUARANTEES

On which all the No. 400
Champion Steel Blowers
and Forges are Sold:

They must represent the finest, as well
as the most perfect mechanical
construction that can be built by
human hand.

They must represent as set up machines,
or in all their parts, extreme accuracy,
with the highest and finest finish that can
be placed on machinery.

They must represent the best metals for their
various parts that money can buy.

They must represent perfectly
noiseless and smooth running
Blowers and Forges.

They must represent Blowers that
will make a white heat blast fully
equal to the best power blast.

They must represent Blowers
that will increase the earnings of
every hand fire 50 cents per day,
and on heavy work \$1.00 per day.

SPECIAL NOTICE

The No. 400
Champion
"Whirlwind"
Blast Anti-Clinker Heavy Nest Tuyere Iron
goes with every No. 400 Blower, No. 408 and
No. 409 Forges since July 1, 1905, at their
regular price.

The Famous
No. 400 Blower is con-
ceded by over 180,000 sat-
isfied users as being the best.

Write for our 1905 228-page Catalogue, illustrating the largest and
most complete line of Blowers, Forges, Blacksmith Drills, Tire Benders and
Shrinkers, Screw Plates, Power Blowers, etc., etc., manufactured under one management in the world.

The No. 400

Champion Steel Blowers
and Forges are all sold
on ten (10) days' trial,
without cost or expense
if not satisfactory.

CHAMPION BLOWER & FORGE CO. Lancaster, Pa., U. S. A.

DON'T BUY GASOLINE ENGINES

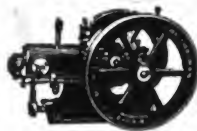
Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. Cost less to buy and less to run. Quicker and easier started. Weight of one-cylinder engines. Please give size of engine required. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

THE TEMPLE PUMP CO., Established 1853. Meagher and 15th Streets, CHICAGO.



EXTENSION NUTS SENT ON APPROVAL
Cure wobbles and make old buggies run like new. Samples free to agents. (Profitable).
Hardware Specialty Co., Box G to, Pontiac, Mich.

ENGINE AND BAND SAW



Blacksmiths and Wheelwrights cannot afford to run a shop without one. Pays for itself the first year. The Chapman is built right and stays right. You had better investigate now.

H. L. CHAPMAN, Box A. B., Marcellus, Mich.

Why Not Stop Your Troubles?

"A Wizard Tubular" Does It.



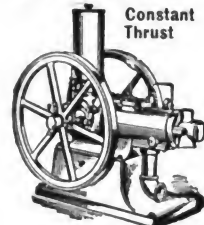
Armature incased in WATER-PROOF non-corroding brass tube. All brass screws. Friction, Belt or Governor drive. Brush-holders removed without loosening screws. All parts polished brass. Contact and Jump Spark. A TRIAL WILL CONVINCE YOU. Most popular and satisfactory Magneto on the market. Price as popular as Machine.

GOVERNOR DOES AWAY WITH BATTERIES AND SWITCHES.

HERCULES ELECTRIC & MFG. CO.
INDIANAPOLIS, INDIANA.

Write for catalogue and SPECIAL OFFER.

The MIETZ & WEISS Oil and Gas Engines



Constant Thrust STATIONARY and MARINE
1-60 H. P.
Adopted by the U. S. and Foreign Governments.

Most Economical and Safest Power known. Run with common kerosene, distillate or fuel oils.

It will pay you to consult me before placing your order elsewhere.

For all Power Purposes. Thousands in use. Highest award for Direct Coupled Engine and Dynamo, Paris Exposition, 1900.

Gold Medal, Pan-American Exposition, 1901.
Gold Medal, Charleston, S. C., Exposition, 1902.
Gold Medal, Louisiana Purchase Exposition.

A. MIETZ, 128-138 Mott St., New York
Send for Catalogue, Dep. 34.



NO HELP WANTED

Blacksmiths, why not save the cost of helpers by letting a "Badger" gasoline engine do the work of two men for you? Helpers cost \$2. a day. "Badgers" less than a cent an hour per horse power—see the difference?—that's your saving, if you have a "Badger."

"Badgers" are built to do work, and have a wide range of usefulness in a blacksmith's shop. Install one and you will do more work, better, quicker and easier. "Badgers" are easy and quick to start. They embody the latest practical improvements; run smoothly; are durable; cost almost nothing for repairs—Like the minute man, they are "always ready." That's why they were adopted by the United States Government. Guaranteed to give perfect satisfaction. All styles—Stationary, Portable or Traction—Horizontal or Vertical—and from 2 to 30 horse power.

Write to-day for our handsome, 48 page catalogue in colors, and special terms.

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Office, 103 West Water St.
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Blacksmiths, get the agency for unoccupied territory

PATENTS that PROTECT

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R. S. & A. B. LACEY, Patent Att'ys, Washington, D. C.
ESTABLISHED 1869



WEEBER Gas and Gasoline Engines

For all power purposes. Workmanship the highest, price per H. P. the lowest. The kind that will run smooth and keep running. Not an experiment, but tested out by four years' continuous running. Guaranteed for one year and to give absolute satisfaction. Agents wanted. Write for full particulars.

C. S. WEEBER MFG. WORKS
Albany, N. Y., U. S. A.

ACME STATIONARY STEAM ENGINES

BEST ON EARTH.

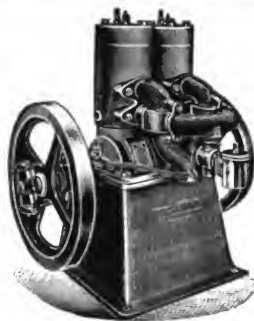
Have automatic shaft governor that controls the speed perfectly. They deliver their full rated power with steam at 80 lbs pressure, and run with less jar and with less attention than any small engine built.

Built in Sizes ½, 1, 2, 3, 4, 5 and 8 H. P.

Built strong enough to stand hundred pounds' pressure. Just the engine for small shops. You ought to have one. Let us send catalogue.

ROCHESTER MACHINE TOOL WORKS,

Cor. Frank and Commercial Sts., ROCHESTER, N. Y.



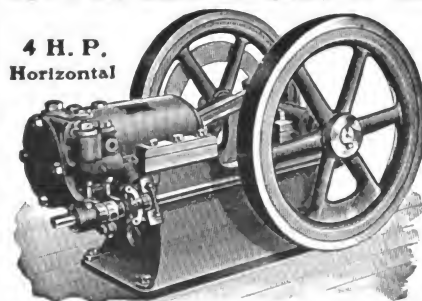
The Maxwell & Fitch Gasoline Engine

Two cycle, a power impulse every revolution, we use no gears, cams, cam shafts, valves or valve springs, no engine can be simpler or more durable. If you want a well built engine, one built of the best materials, then just send us a postal for our catalogue and price list.

THE MAXWELL & FITCH CO.
ROME, N. Y.

LITTLE GIANT GAS & GASOLINE ENGINES

4 H. P.
Horizontal



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.

No. 63 Dale Ave., DAYTON, OHIO.

The Beaver



3½ H. P. gasoline engine all complete ready to run. Can be moved anywhere.

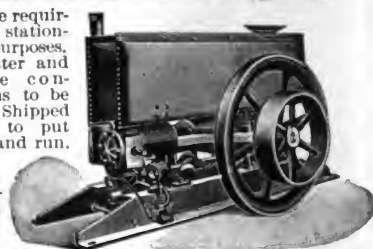
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BEAVER ENGINE CO. 222 East 2nd Street, CINCINNATI, O.

THE "ABENAQUE" Gas and Gasoline Engines

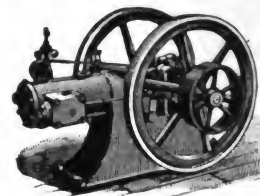
No base required for stationary purposes. No water and gasoline connections to be made. Shipped ready to put down and run.

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Abenague Machine Works
P. O. Box 208, WESTMINSTER STATION, VT.

THE ENGINE THAT MEETS THE DEMAND OF THE DAY



THE "WATKINS"

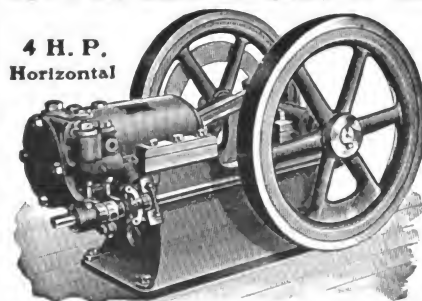
It has always been our aim to build the best engines possible, regardless of cost, and to so systematize their manufacture that they can be sold at a fair price. All sizes from 2 to 15 H. P.

OUR CATALOG IS AT YOUR SERVICE.

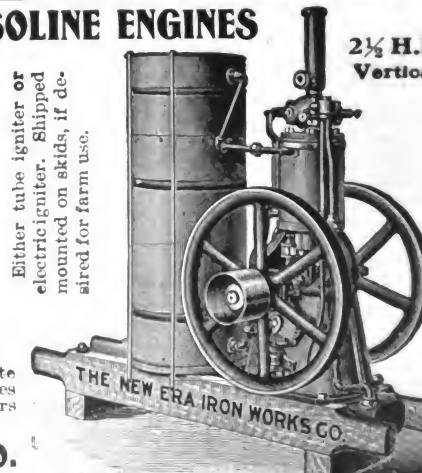
THE FRANK M. WATKINS MFG. CO.
537-549 Baymiller St., CINCINNATI, OHIO.

LITTLE GIANT GAS & GASOLINE ENGINES

4 H. P.
Horizontal

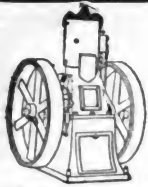


2½ H. P.
Vertical



Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

THE NEW ERA IRON WORKS CO.



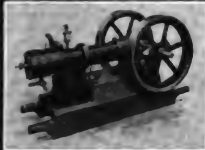
KEROSENE ENGINES

Safe, Sure, Simple, Reliable and Efficient. Most Economical Power in the World. Especially Adapted for Shops Using Small Power. Cheaper and Safer than Gasoline. No Sparker. No Igniter.

WRITE FOR DESCRIPTIVE CIRCULAR AND PRICES.

WHITEHALL ELECTRIC CO., 32 Park Place, N. Y.

THE "ELI" LEADS 'EM ALL



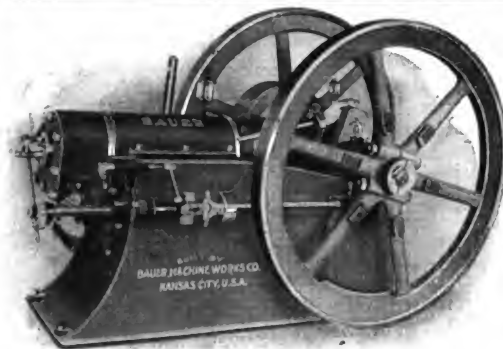
THE "FOOL-PROOF" GASOLINE ENGINE

The "ELI" Gasoline Engine is the only fit engine to have on a farm, where one is a good way from the repair shop. The "ELI" is so simple that there's nothing to get out of order. It will run year in and year out without the tinkering that other engines require.

It is the only engine without cams, gears, and levers. We call it "Fool-Proof" because, if some simpleton or a child should monkey with it, he couldn't make it dangerous. It's absolutely safe. Isn't that the kind of an engine YOU want? Then write for our free booklet, telling how and why it is so simple and safe.

MOLINE PUMP COMPANY, Sole Mfrs..

MOLINE, ILL.



BAUER GASOLINE ENGINES..

The Acme of Simplicity and Perfection.

If you will examine and compare, piece by piece, you will say there is no other quite so good as the "Bauer." All sizes from 1½ to 20 H.P. Write at once for free catalogue containing long list of letters from satisfied users. Our prices are also very interesting, considering quality.

THE FIRST BLACKSMITH in any town who buys of us gets the agency for his locality, a discount on his purchase, and a commission on his sales. A good engine sells readily. The Bauer is the best.

Write us Today.

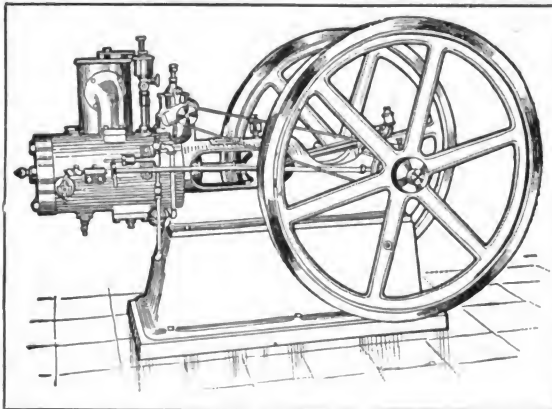
Bauer Machine Works Co.

115-120 W. 18th St., KANSAS CITY, MO.

Dempster Gasoline Engines

SIMPLE, DURABLE, SAFE

Two Cycle Type. Smooth Running, Practically No Vibration.



2

TO

30

H. P.

BUILT

TO

WORK

READY FOR BUSINESS ANY TIME.

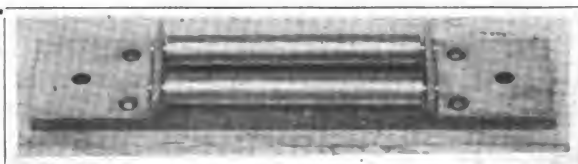
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DEMPSTER MILL MFG. CO. Beatrice, Neb.

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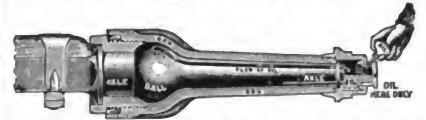
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Roller Reach Irons. Wear twice as long as the old kind. Do away with greasing sway-bar, and allow wagon to turn without friction.

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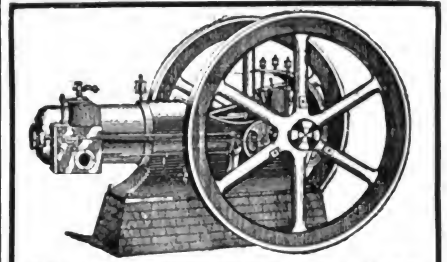


We supply the castings, drawings and all accessories. A complete line of rough castings, also finished Motors for Bicycle, Automobile, Marine or Stationary. A 2-cent stamp gets our catalogue.



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A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

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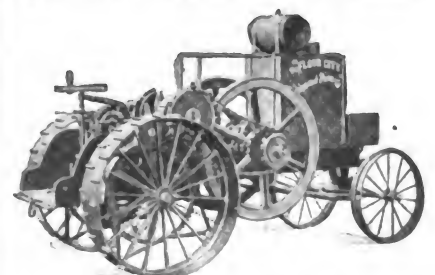
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The Flour City GASOLINE ENGINES

TRACTION = PORTABLE = STATIONARY



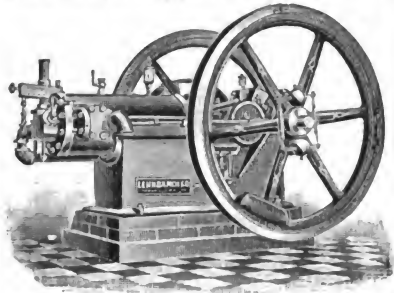
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THE LENNOX ENGINES

GAS OR GASOLINE

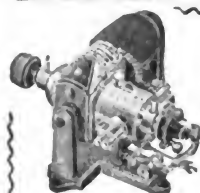
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OUR electric igniter can be cleaned while the engine is running. Other makes cannot be cleaned without stopping and taking the igniter out. Send for catalogue.

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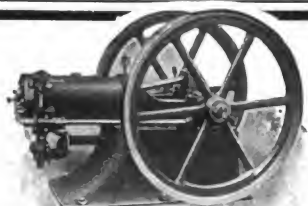
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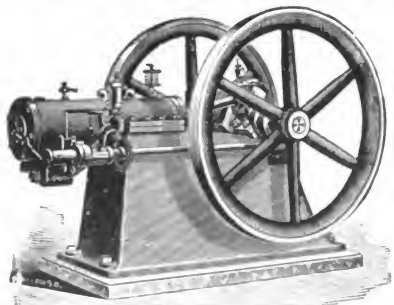
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ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33. Stating Horse Power You Need.

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Columbus, Ohio.

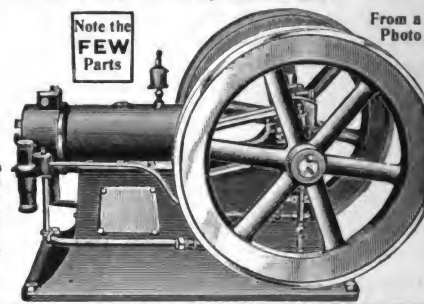
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Let the McVicker do the hard, back-breaking work of the shop. It will cost you only 1¢ per horse power per hour when it is working. Isn't your time worth more than that? It will work the bellows, run the drills, operate the trip hammer, and do a thousand and one things that wear out the muscles, and will do it hour after hour without getting tired or requiring attention. Just start it and let it alone—that's all. It has one-third the parts of any other Gasoline Engine—no mystifying cogs, gears, cams, tumbling rods or ratchets to get out of adjustment. The

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GASOLINE ENGINE

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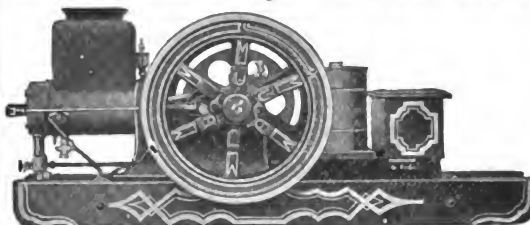
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SPARK
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COUNTS



YOUR ENGINE will work better, give you less trouble and carry a bigger load, if you ignite with one of our **Improved Mueller Spark Coils**. Furnished for use with batteries or dynamo. WE GUARANTEE our coils against all imperfections in workmanship and material. If your engine doesn't ignite properly, write us. Information cheerfully given. Correspondence solicited.

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The Easy Starting LAUSON



5 H. P. Special.

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Is built for zero weather. It has no water tank and pipes to freeze up. Two pails of water is all that is required to keep the engine properly cooled. This feature and our improved generator valve make this an ideal engine for winter work. It will start as easy and work as well at 20 below zero as in summer.

Write for our 1905 catalog describing our line of stationary and portable Gasoline Engines from 2 to 20 H. P. We want Blacksmiths everywhere to act as agents.

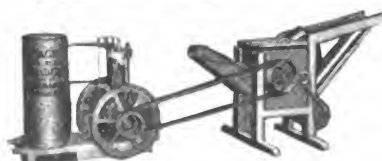
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The Cost of Maintaining

an "Otto" engine is slight. Good materials, good design and good workmanship are responsible. Jacob Stambach, Blacksmith, Ayreshire, Iowa, says:—"My engine has been running seven years and is always ready to go Winter or Summer. I never spent a nickel for repairs and it is just as good to-day as it was seven years ago." Does such a record appeal to you? Then buy the "Otto." A little higher priced in the beginning may be, but—cheapest in the end.



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STANDARD OF THE WORLD



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Fairbanks-Morse
Gasoline or Oil Engines

are the best—they were awarded Grand Prize and Gold Medals at World's Fair, 1904, and there are over 400,000 H. P. in use.

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Engine to run _____

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A Practical, Economical, Money-Making Machine for Blacksmiths. All Heating Done Inside the Shop and Done Quicker and Better Than by any Other Method.

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HENION TIRE HEATER COMPANY
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Which is coming into favor again is here illustrated, the



**Stivers
Long Swell**

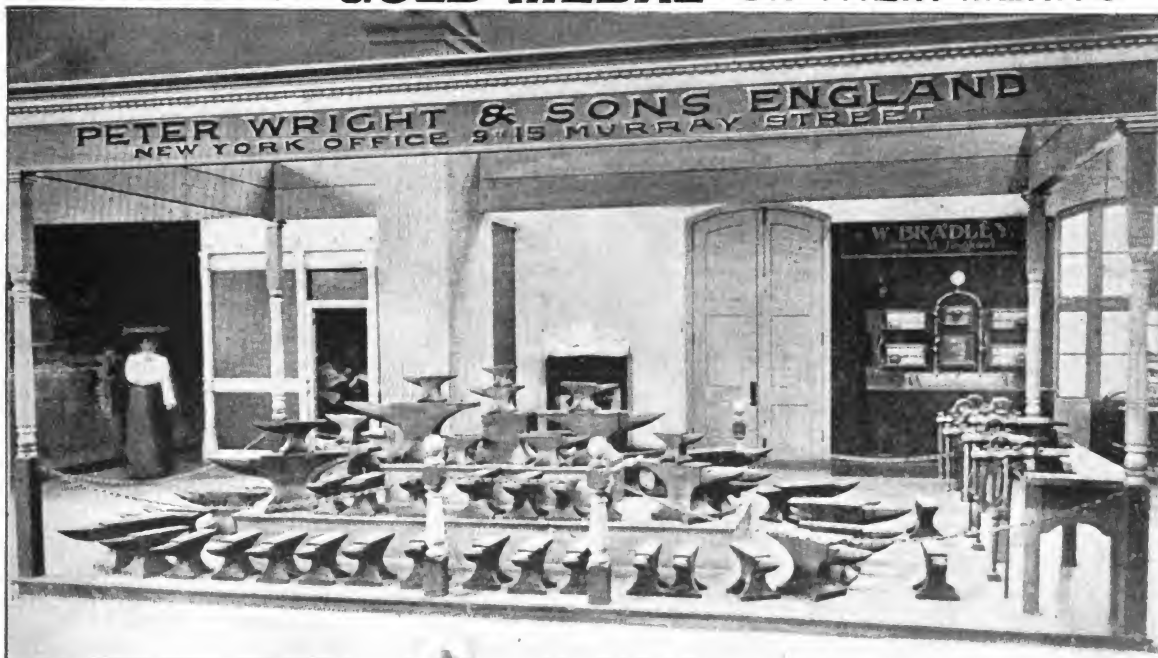
We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

*If you wish further particulars
Write to the*

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RANK ABOVE ALL OTHERS. AT THE LOUISIANA PURCHASE EXPOSITION THEY WERE
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Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
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Low Down Wagons

soon earn their cost on any farm.

Steel Wheels

for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to
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REMINGTON
Billing Typewriter
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In addition, it's the cheapest billing machine because it's a Remington—you know how they last.

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ADJUSTABLE TIRE HEATER

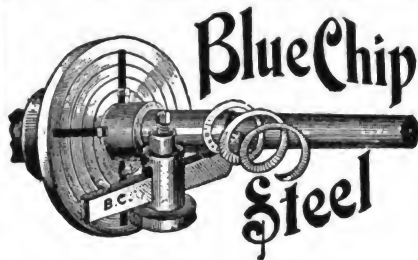


It will heat any weight of tire and is adjustable to all sizes. Will do it quickly and at small cost.

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Offices: Spitzer Building,
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Will turn off blue chips on any kind of work.

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See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

**NO
LAMENESS
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CHEAPEST
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Medium Canvas Back

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Sole Manufacturers **BOSTON, MASS.**

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The Victory Corn and Feed Mills.

**OLDEST AND BEST
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**STRONG,
SIMPLE,
DURABLE.**

Especially adapted to grinding ear corn, shelled corn, wheat, oats, rye, etc.

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WITH 4-IN. TIRE STEEL WHEELS

Our wagons are well ironed throughout—wheels made with round staggered spokes.



We make any size wheels to fit any skein.

We manufacture a complete line of metal wheels for corn-planters, cultivators, plows, etc.

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—Handy Farm Wagon—
THE BEST METAL WHEEL WAGON MADE.



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Pressed steel wheels, any height and width tire, interchangeable hubs. Gears of selected stock, thoroughly ironed. Made in several styles.

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EACH ONE GUARANTEED.

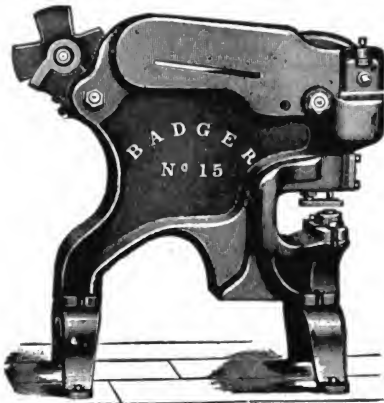
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Will punch $\frac{5}{8}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{5}{8}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{4}$ " band iron.
Will shear 1" round bars.

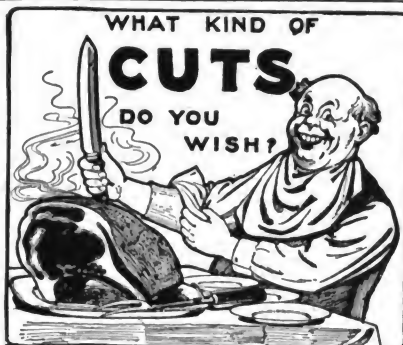


Weight 800 Lbs.

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CUTS for Circulars, showing exactly what is needed.
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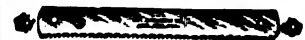
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The Most Powerful Lever Punch and Shear Made.

This is not a new machine—only a new cut showing the improvements we have lately added—making it more valuable for the blacksmith. It is made in three sizes. No. 1 will punch $\frac{3}{4}$ in. hole in $\frac{1}{2}$ in. iron; cuts iron $\frac{3}{4}$ in. thick and 1 inch round. Weight, 500 lbs. No. 2 will punch $\frac{1}{2}$ in. hole in $\frac{3}{4}$ in. iron; cuts iron $\frac{1}{2}$ in. thick and $\frac{3}{4}$ in. round. Weight, 350 lbs. No. 3 will punch $\frac{1}{4}$ in. hole in $\frac{3}{4}$ in. iron; cuts iron $\frac{3}{4}$ in. thick and $\frac{3}{4}$ in. round. Weight 275 lbs. Each machine is equipped with five sets of punches and dies. This machine is made for the blacksmith shop and we do claim that it is decidedly the best on the market for that place, and can furnish any amount of testimonials to that effect.



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The letter "S" appears on the head of each nail.



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Best Nail in the World BAR NONE.**DEALERS' NET PRICES TO SHOERS.**

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We mean every statement made above.

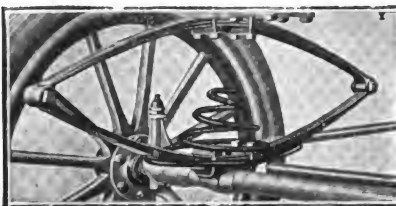
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A GOOD
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THAT
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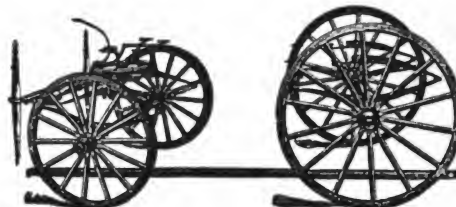
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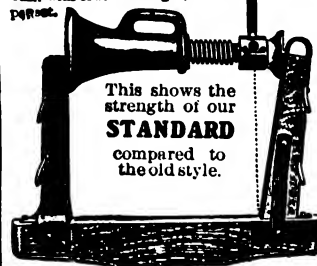
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1,000 Styles
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We make the following sizes:
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" 2, 3 1/2 " " 14 "
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The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

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2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

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IRON, STEEL
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Acme Hand Blower

For Blacksmiths

It has the unqualified
indorsement of
every mechanic who
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Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

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Prosperous Shops,
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They all go together--
A happy combination.



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BANNER WELDING COMPOUNDS

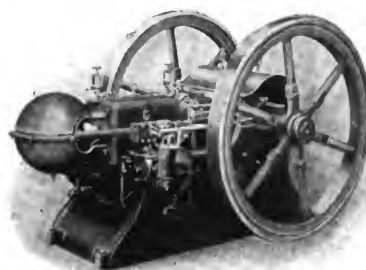
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GAS and GASOLINE ENGINES



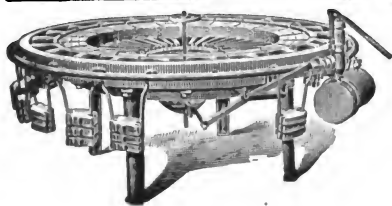
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Power.**

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VOLUME 4

THE

NUMBER 11

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

AUGUST, 1905

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Prices to
Carriage Makers
and Blacksmiths
if this paper
is mentioned.



Fig. 900, 12 inches.

Fig. 900, "Elite," Silver Blower (patent applied for) is distinctive in design, has cut gearing and removable, interchangeable bronze bearings for gear pinions. The gearing is self contained and attached to side of fan case, has an outer bearing plate over it and is thus permanently secured so that there is no unnecessary friction or lost power. The gear covering is removable without disturbing the gearing or paddle spider. There is a light tuyere for clay lining and a heavy one to use without lining. All parts are interchangeable.

Fig. 822, Band Saws are made in sizes 20 and 26 inch for foot or belt power and 32 and 36 inch for belt power. They are properly constructed, nicely finished, adapted to factory and repair work of every kind and give unusual satisfaction.

Fig. 718, Spoke Tenon Machine cuts tenons $\frac{1}{4}$ to 2 inches diameter up to 6 inches long and also bores the felloe.

Fig. 709, Taper Hub Boxing Machine is made as illustrated, on legs and also without legs to mount on bench. It bores tapering holes in the hubs for the boxes and cuts the recesses for nuts and collars.

Made also for hand and power.

Also Forges, and a complete line of Hand and Power Drills.

Manufactured by

— THE —
SILVER MFG. CO.,

365 Broadway,

SALEM, OHIO.

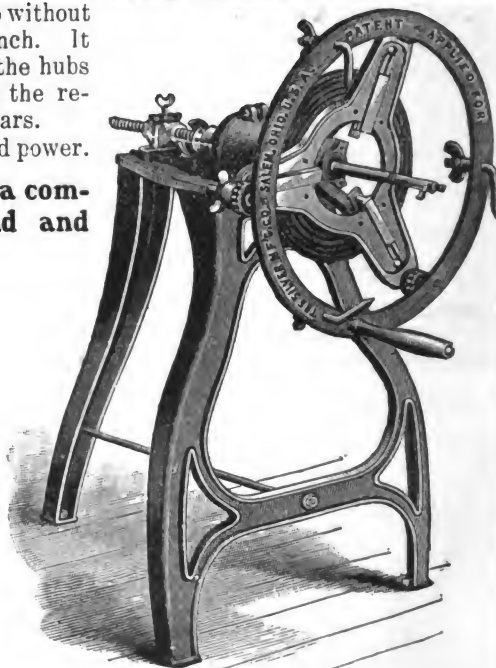


Fig. 709.

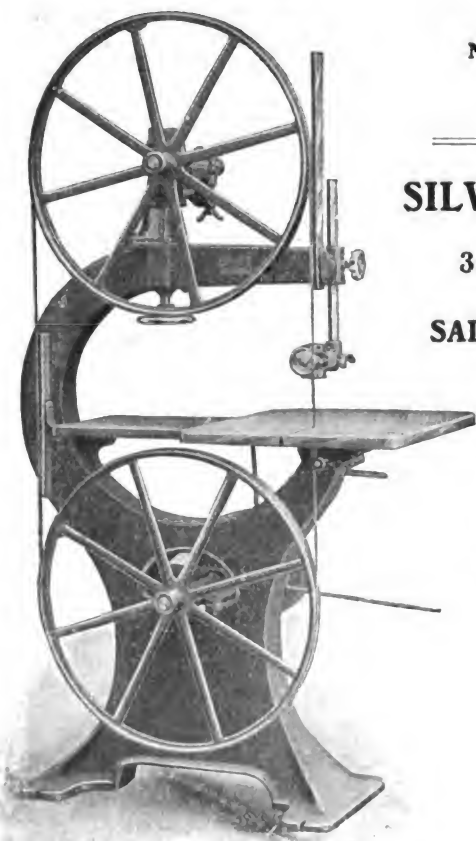


Fig. 822, 32 inch.

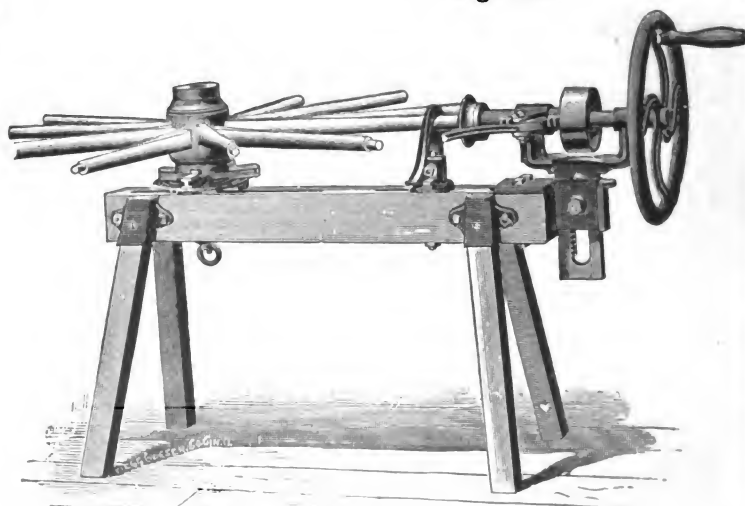


Fig. 718.

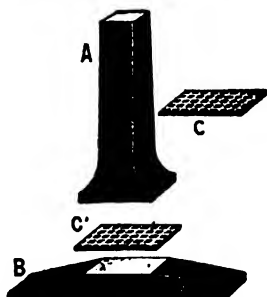
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CHEMICALLY WELDS AT A LOW HEAT

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Lap, Butt or Wedge Welds

DIRECTIONS.—As above illustrated simply withdraw pieces from fire at proper heat and place a piece of Laffitte Plate between the parts to be welded. Press lightly until plate fuses, then hammer lightly followed by usual hammering.

Saves 33 per cent. in time and fuel and gives an entirely homogenous joint.

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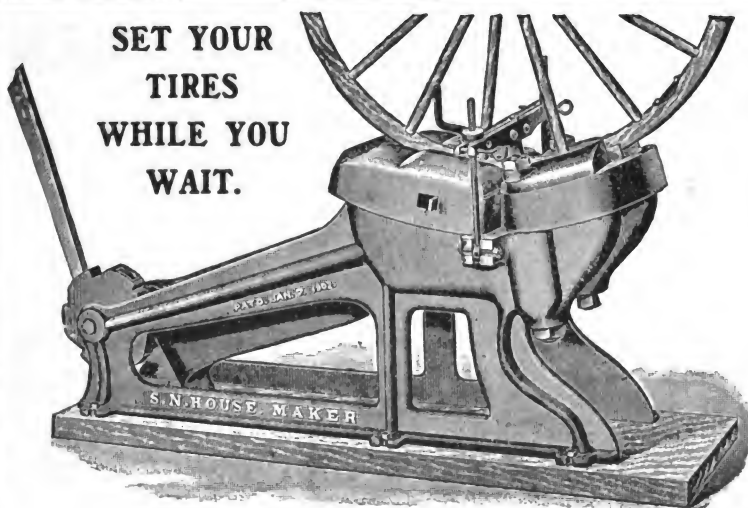
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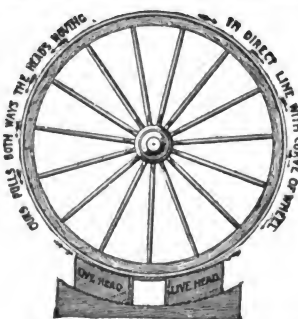
SET YOUR
TIRES
WHILE YOU
WAIT.



THE HOUSE COLD TIRE SETTER

Nearly 2,000 in successful use and all of them placed in the last three years. This demonstrates the fact that a **Successful Cold Tire Setter** has been made after twenty years' hard work and after fifteen patents have been issued to other inventors which we must admit have comparatively all failed; but don't let that discourage you. The first locomotive, sewing-machine, and harvester were failures, but are a success now and so is our machine. It is simple and works on the principle of the hot tire shrinker, and it can't be broken, and you can't make a mistake in buying it. Write us for catalogue and prices.

This cut represents our machine and shows the way the heads move with the circle of the wheel, pulling the tire from both ways, tightening it around the wheel without kinking the tire and injuring the felloe.



**Which do You Think will do the Work the Best?
Which will Please Your Customers Best?**

This cut shows the way other machines do the work. The heads move on a straight or horizontal line and do not follow the curve of the wheel. See how they crush in the felloes and kink and bend the tire up.



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Office and Factory, 216 to 220 South Third St.,

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Perfect in Form and Finish

Plate Pattern



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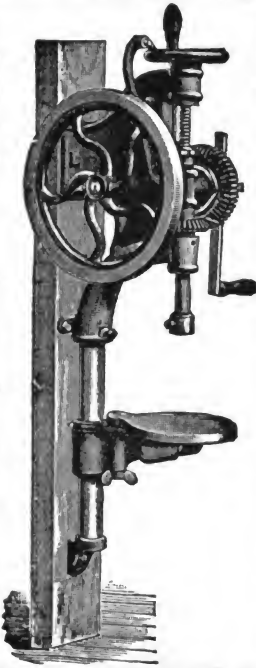
This ad. and \$5.00 must accompany order.

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We are selling goods to the trade by mail, saving all travelers' expense and we give our customers the benefit of this saving.

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Get Ready for Fall Trade

And Buy a Stock of



Star Plow Shares. They are Right.

*All qualities and sizes
and every one guaranteed. For sale by jobbers everywhere.*

Star Manufacturing Co.

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OF COURSE this is an impossible picture, but it will serve to call attention to the West Tire Setter, a tire setting machine that does all the work of setting a tire better than it can be done any other way, and in one minute, as against an hour by the old way. Every manufacturer of vehicles or wheels and every repair man and blacksmith should have one. Saves its cost and shows a handsome profit in a very short time.

WRITE FOR CATALOG.

The West Tire Setter Co. Rochester, N.Y.



WILL SHEAR:
 $\frac{1}{2}$ x 4" flat iron bars.
1" round iron bars.

WILL PUNCH:
 $\frac{1}{2}$ " hole through $\frac{1}{2}$ " round plate, also punch to the center of 12 inches

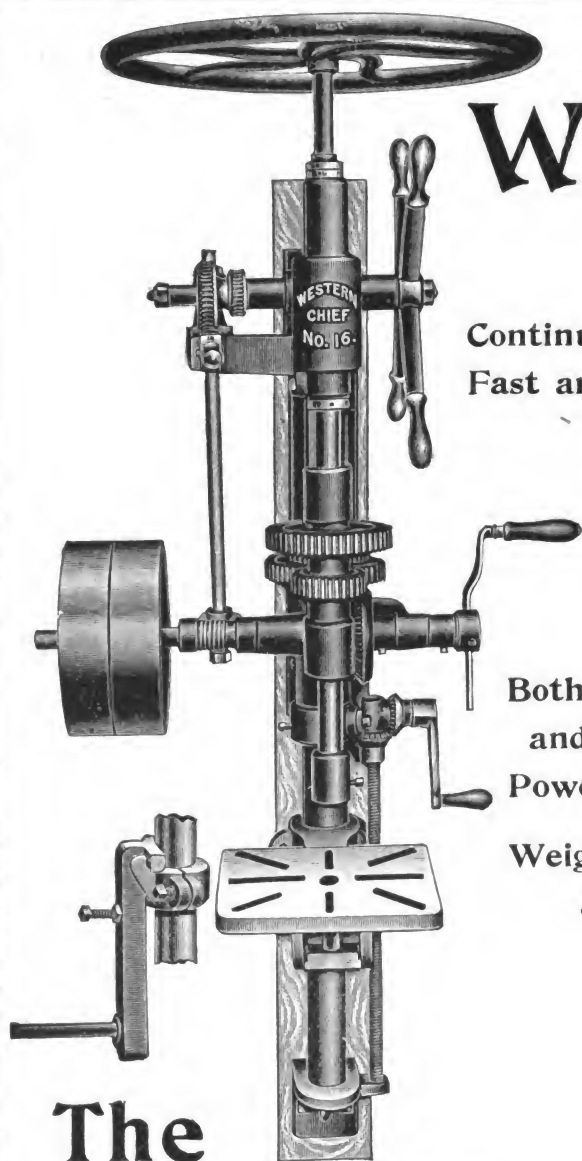
Weights
600 lbs.

New Badger COMBINED Punch and Shear

The body of these machines are cast in one piece. All shafts, pins and king bolts being made of steel. The mandrel which holds the punch is made square to avoid turning and spoiling the dies when square or irregular shaped punches are being used.

Hand lever works toward the back of machine in both cutting and punching.

Badger State Machine Co.,
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No. 16 Western Chief DRILL

Continuous Screw Feed.

Fast and Slow Speed.

Raise and Lower to Table.

Drills to center of 24-inch circle.

Bores 0 to 1½ in.

Spindle runs up and down 8½ inches.

Table runs up and down 16½ inches.

Both Hand
and Pulley
Power.

Weighs
360 lbs.

Hand Lever Feed.

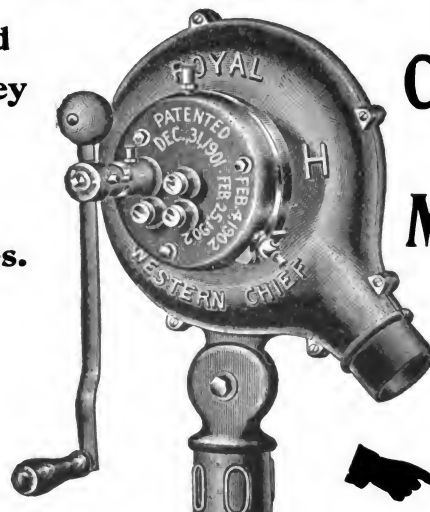
All Gears are Cut.

The Royal Blower

is absolutely free from all spiral or worm gears, and has not a ball bearing in it. Spiral and worm gears are short lived, and ball bearings are not suited to such high speeds. Phosphor bronze is used for the lead gear and bearings; and steel for the pinions and shafts. It is the simplest, lightest running and surest worker of any Blower on this day's market.

FAN, 12 inches diameter.

FIRE POT, 9x11½x4, inside.



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**CANEDY-
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CHICAGO
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Western Chief
Forges, Blowers
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With 25 years' experience I consider your "Always Sharp" Calk the best adjustable calk I have ever seen. *Wallace Lottridge.*
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Some of the Bows we make. Write for catalogue describing our full line.



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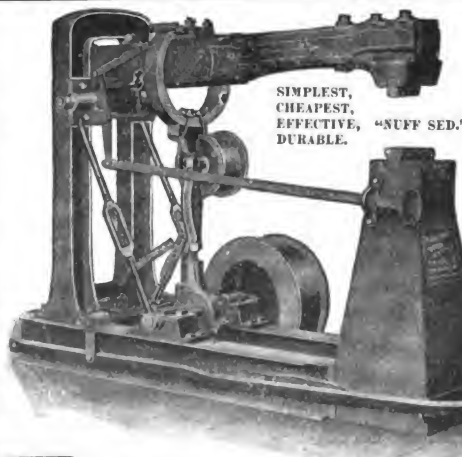
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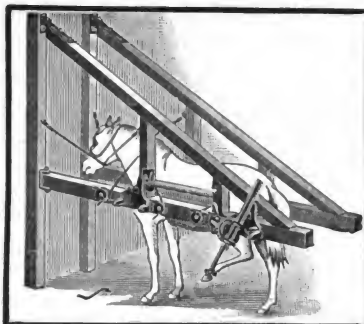


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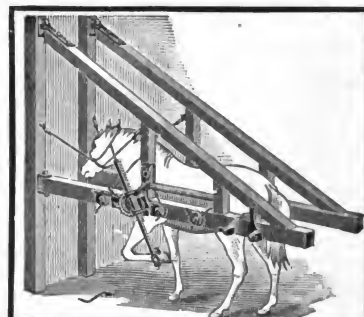


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Wrenches is al-
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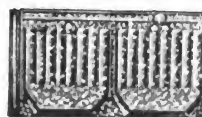
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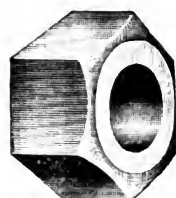


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 THE BEST
BOLT CLIPPERS

H. K. PORTER, Sole Manufacturer
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We are not offering you an experiment in the Brooks and if you are considering the purchase of a cold tire setter it is well for you to understand that it is utterly impossible for a cold tire setter to be perfected in a day, in a month or in a year.

Even the Brooks of today, the leading cold tire setter on the market, the first successful edge grip machine, is quite improved over the Brooks of ten, or five, or even three years ago. The Brooks was originally built on the right principal, as has been proven by time and experience, but the Brooks has been improved until today it is an absolutely perfect machine for the setting of tires cold.

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We present FACTS.
 The Brooks was awarded the highest medal of award given any tire setter at the St. Louis Exposition.

The Brooks is the only cold tire setter that has been adopted by the United States Government. The Brooks is the machine that is giving satisfactory results in more blacksmith shops than all other cold tire setters on the market.

Why? The Brooks is built right and the machine as well as the many valuable improvements are patented and imitators cannot use these improvements without infringing.

Why? Because we have had twelve years' experience in perfecting the Brooks and are building a cold tire setter we absolutely guarantee to do perfect work.

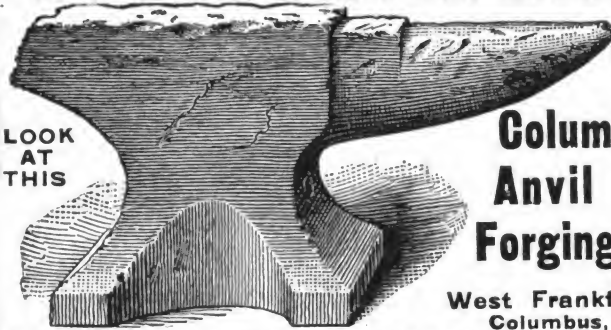
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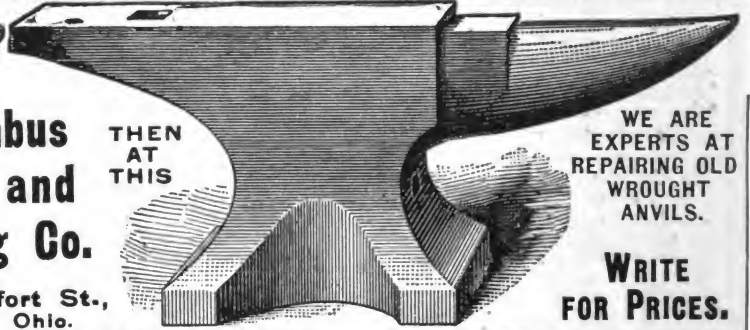
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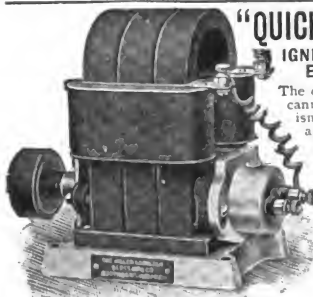
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The Erie Railroad System's Industrial Department has all the territory traversed by the railroad districted in relation to resources; markets and advantages for manufacturing, and can advise with manufacturers of specific products as to suitable locations, furnishing them with current information of a comprehensive nature, dealing with the project in its full relation to manufacture and commerce.

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THE
**KITTERMAN
INVENTION CO.**

81 W. Washington St.
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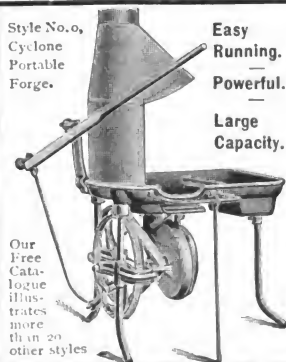
Manufactures all kinds of
Rubber Pads and Taped
Shoes and Screw Calks at
prices to defy com-
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Circular and know
the rest.

CYCLONE PORTABLE FORGE

The Cyclone Portable Forge, shown here, is a favorite everywhere. Suitable for heavy, as well as light work. Has a 28x40 in. hearth, large capacity coal box and a 14 in. fan. The deep firebox and powerful blast make the Cyclone Style No. 0 capable of doing the heaviest kind of work. The Cyclone has double Ratchet, Adjustable Legs, Solid Frame, Detachable Lever hung on Ball Joint and swinging in chilled seat. FULLY GUARANTEED.

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other styles

TRY THIS AXLE GAUGE 30 DAYS FREE

Sent anywhere on trial. No shop complete without it. Once used, always used.

THE REYNOLDS AXLE GAUGE excels all others in simplicity of adjustment, and accuracy of gauge.



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Read what M. O. SANBORN of LAKEWOOD, O., says about it: "I have used the Reynolds Axle Gauge about two years and I consider it the most valuable tool in my shop. It saves more time, labor and money than any tool I use. Simply couldn't run my shop without it."

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New Rounding Hammer.

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THE JOSEPH F. MCCOY COMPANY, 157 Chambers St.,
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TRADE MARK



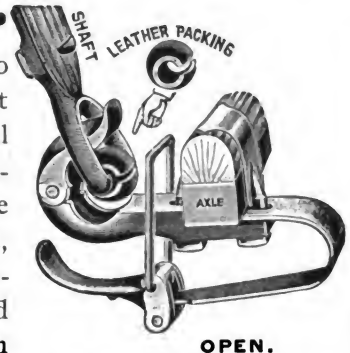
Our Trade Mark Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.

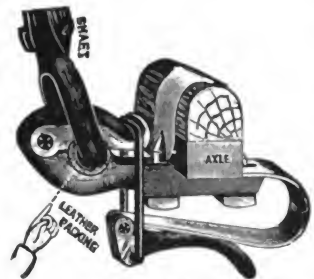
A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,
Syracuse, New York.



OPEN.

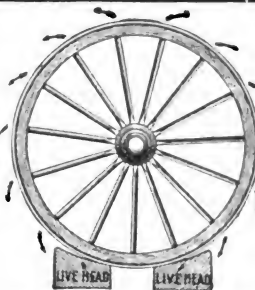


CLOSED.

MAYERS COLD TIRE SETTER

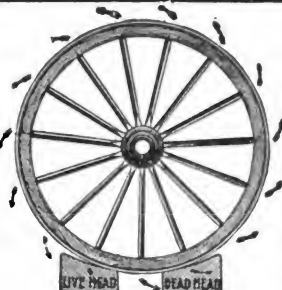
GUARANTEED. PERFECT WORK WARRANTED.

Drawing Tire both sides at same time insures uniform dish.
Five minutes to set a tire and do it perfectly.



These Arrows

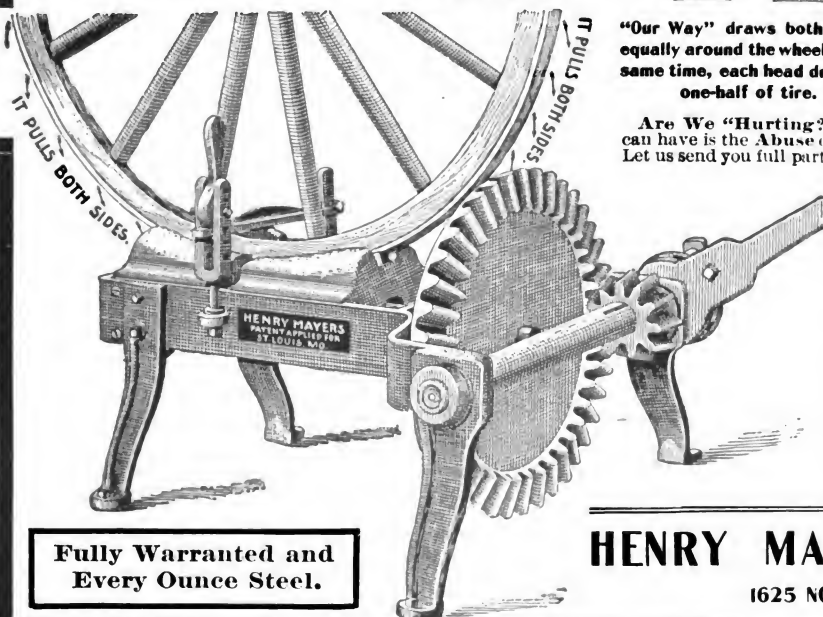
show the DIFFERENCE also show that they have PIERCED our esteemed competitors and called forth EXPLANATIONS ABUSE, VENOM and ADVICE that would not sound very well in A CLASS MEETING ON A SUNDAY. Advice is always CHEAP. Interested Advice, DANGEROUS.



"Our Way" draws both sides equally around the wheel at the same time, each head drawing one-half of tire.

"All Others" have one dead or stationary head, and the one live head must draw tire all around the wheel.

Are We "Hurting?" No, indeed. The Highest Indorsement any machine can have is the Abuse of its competitors.—Better investigate ours before you buy.—Let us send you full particulars and easy terms of the only Cold Tire Setter having Both Heads coming together at same time.—The only machine in which the Grip Keys Set Themselves. The only machine having No Lost Motion and does not require Wedges or Keys to take up "slack" and get "new hold."—A 3/4" screw with Right and Left Nuts brings Both Heads together.—Look at Gears and see the Power.



Fully Warranted and Every Ounce Steel.

HENRY MAYERS MACHINERY CO.

1625 NORTH 7TH STREET, ST. LOUIS, MO.

St. Louis, Mo., July 3d, 1905.

HENRY MAYERS MACHINERY Co.,
1625 N. 7th St., City.

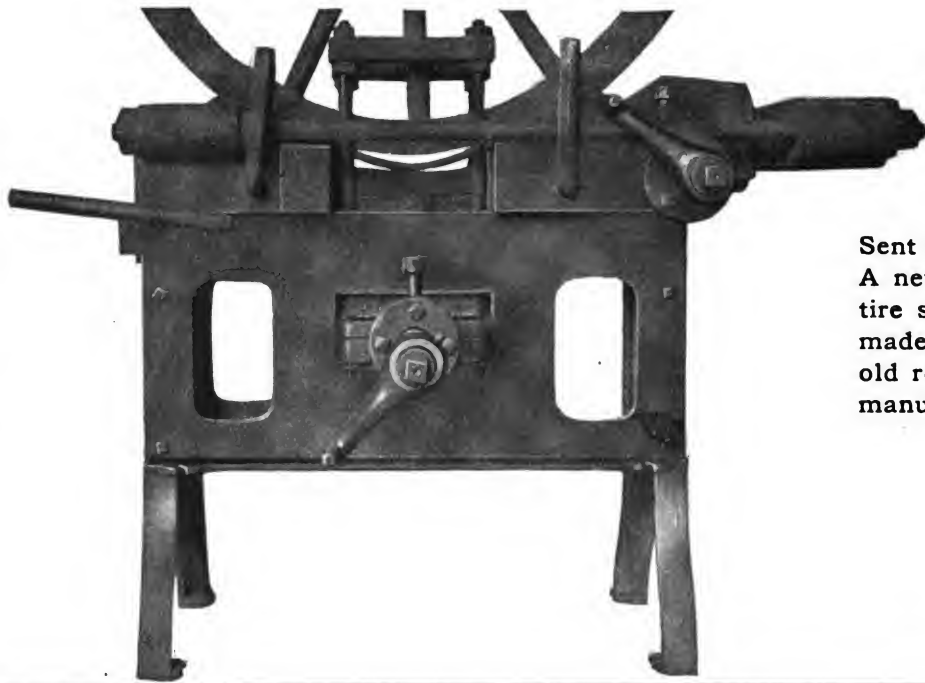
DEAR SIR:—I have tested your Cold Tire Setter and find it entirely satisfactory. The fact that both heads come together at same time places it far ahead of any other machine. As I have paid you in full for it is the best possible proof of what I think of it. I set a buggy tire in 5 minutes and the machine does it perfectly. The machine is simple, easily worked and no parts to break or wear out. It should last a lifetime. It will prove the best investment that ever went into a shop.

Yours truly,
Manufacturer Wagons and Repair Shop.

CHRIST, ALBRECHT,
2530 Salisbury St.

A SQUARE DEAL

All purchasers
are protected by
our guarantee.
Special privileges
granted to
first purchasers.

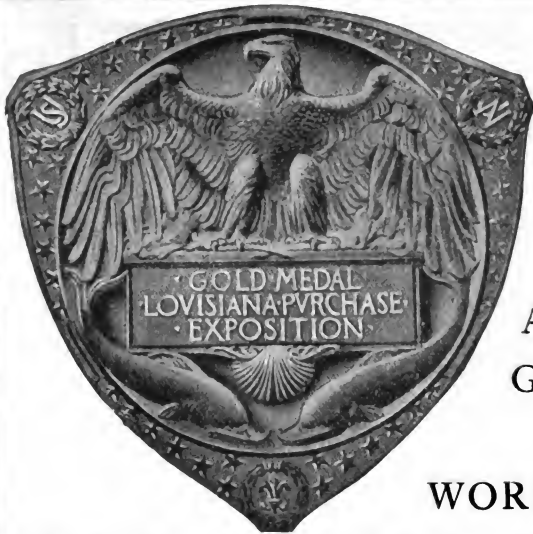


Sent on trial.
A new, scientific
tire setter
made by an
old reliable
manufacturer.

THE SCIENTIFIC Hydraulic Edge Grip Tire Setter

is offered to blacksmiths and wagonmakers of the country as the most efficient side grip machine made. Warranted to be the easiest and quickest in operation. Examine its special features. Consider the advantages of the application of Hydraulic power to this principle of tire setting. With this machine, instead of being bunched in one inch, the tire is first drawn tightly around the wheel and then compressed within a space of four inches. Let us send you one on trial. Investigate our proposition before buying. It is the fairest and squarest deal ever offered to the trade. Write for details. Interesting, descriptive circular sent free.

STANDARD TIRE SETTER CO.
KEOKUK, IOWA.



BUFFALO
GOODS
RECEIVED
HIGHEST
AWARD AND
GOLD MEDAL
ST. LOUIS

WORLD'S FAIR, 1904.

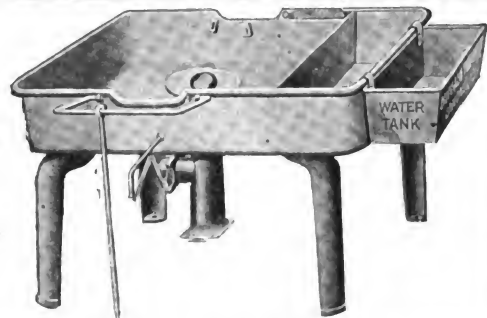
NOW, AS EVER, THEY LEAD THE WORLD!



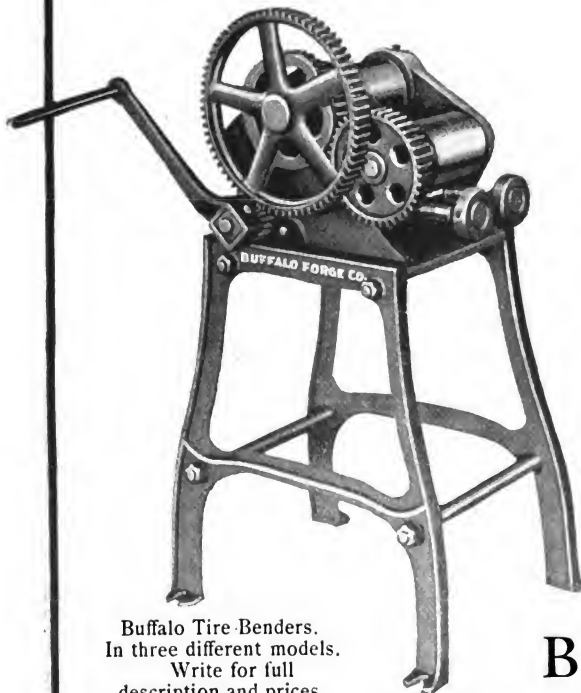
Buffalo No. 604
Steel Plate Forge.



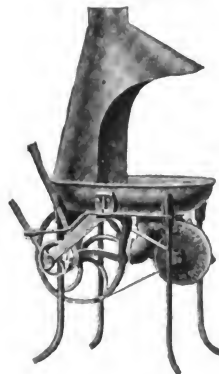
Buffalo Outdoor
Portable Forge
No. 625.



Buffalo Stationary
Forge No. 00S,
for heavy work.



Buffalo Tire Benders.
In three different models.
Write for full
description and prices.



Buffalo Forge with
Power Driven Blast

Send for our Catalogue
illustrating these and other
Gold Medal Tools.



Section of Spindle
Head showing
Ball-Bearings and
Disconnecting
Key.



Buffalo Ball-
Bearing Drills
All Sizes.

BUFFALO FORGE CO.

Manufactured in Canada by the CANADIAN BUFFALO FORGE CO., LTD. MONTREAL.

BUFFALO, N. Y.

Buffalo Forge Company
Buffalo
New York
U.S.A.

Buffalo
No. 200

The Only Blower Built that is Unconditionally Guaranteed for five years against all bills for repairs. Send for sample guarantee bond which goes with each machine sold.

THE APPROVAL OF THE WORLD IS SET ON THE BUFFALO NO. 200 BLOWER

Highest Award and Gold Medal, St. Louis, 1904. Specified by the Japanese Government.

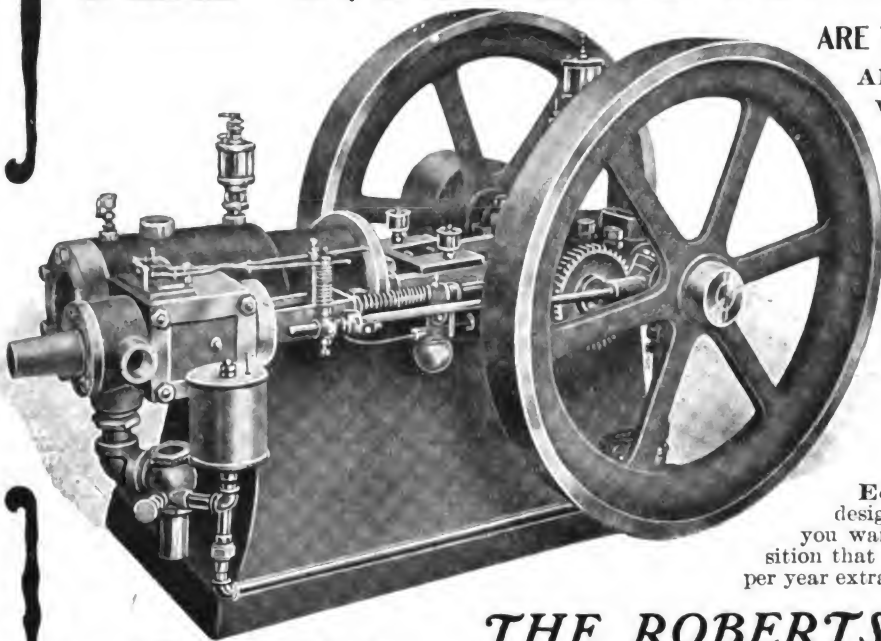
OUR SPECIAL OFFER
STILL A CHANCE
First in the County purchasers of Buffalo No. 200 or 201 Blowers get free our latest improved No. HH side and center blast tuyere. Write for particulars.

Buffalo No. 200 Blower
"The Pride of the Modern Smithy."

Manufactured in Canada by the
CANADIAN BUFFALO FORGE CO., Ltd.
MONTREAL.

The Most Powerful, the Easiest Running and the Most Durable Blower Built.

THE ROBERTSON AUTOMATIC GAS AND GASOLINE ENGINES



ARE WINNERS. THEY NEVER BALK.

Always ready for action. Just what every blacksmith requires. A power that can be relied on.

See that cross head, just like a high class steam engine, saves your cylinder 75% with more power, less fuel and no joints on the inside to trouble you. Improved spark of wipe type operated from cam gear. Makes a spark every second revolution when running under full load. Every working part the simplest. Of course, they cost more to manufacture but we overcome this in the large numbers we make; then, where one goes, more follow, because they are right in every detail. **Built like a watch for long service. Smooth running.**

Economical on fuel. Handsome in design and finish, with full guarantee. If you want the best engine made with a proposition that will net you several hundred dollars per year extra, write us today.

THE ROBERTSON MFG. CO.

N. B.—Our plant has been doubled to enable us to fill orders promptly.

High Class Engine and Tool Builders.

Niagara St., Buffalo, N. Y.

WE HAVE IN MIND

A nice 1906 Calendar to supply to our readers if a sufficient number of them would like to take advantage of

OUR SPECIAL OFFER

50 Handsome Calendars Sent Postpaid for \$2.00

Your Name Neatly Printed on Each One.

50 Calendars and One Year's Subscription, \$2.75

50 Calendars and Two Years' Subscription, 3.25

50 Calendars and Four Years' Subscription. 4.00

Drop us a postal if you think you would like some to advertise your shop. We must know in advance—now. Write today. Present your customers with a beautiful calendar with your name on it, and keep your ad constantly before them the year round. Shall we count you in?

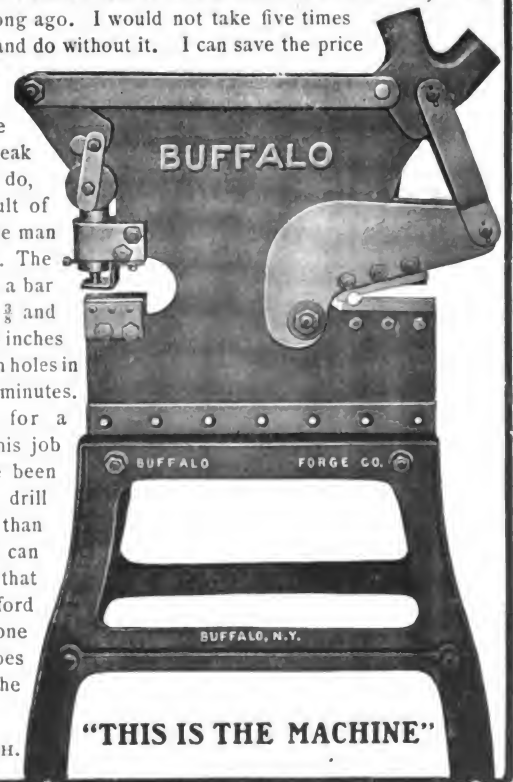
Every smith who purchased Calendars last year was well pleased, and we are sure will want to repeat his order for 1906. Drop us a line today. It will not bind you to order, but we want to know how many are interested.

AMERICAN BLACKSMITH COMPANY
P. O. Box 974 **BUFFALO, N. Y.**

Houston, Pa., July 17, 1905.

BUFFALO FORGE COMPANY, Buffalo, N. Y.

Gentlemen:—The No. 4 Buffalo Armor Plate Punch and Shear is all right and had I known that it was as useful a tool as it is, would have had one long ago. I would not take five times the price of it and do without it. I can save the price of this machine in one year's time and there is nothing to break about it; if you do, it is all the fault of the smith, or the man that operates it. The other day I got a bar of iron $1\frac{1}{2}$ by $\frac{3}{8}$ and cut 10 pieces $4\frac{1}{2}$ inches long, two $\frac{1}{2}$ -inch holes in each piece, in 8 minutes. These were for a hay ladder. This job could not have been done with a drill in much less than 1 hour and I can truly say again that no smith can afford to do without one and when he does buy one, buy the Buffalo.



ISAAC C. PATSCH.

"THIS IS THE MACHINE"

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HENRICKS MAGNETO

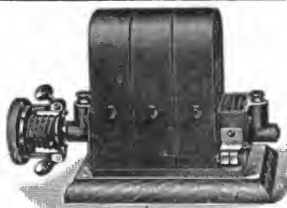
Fires your gas or gasoline engine without the aid of batteries.

It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

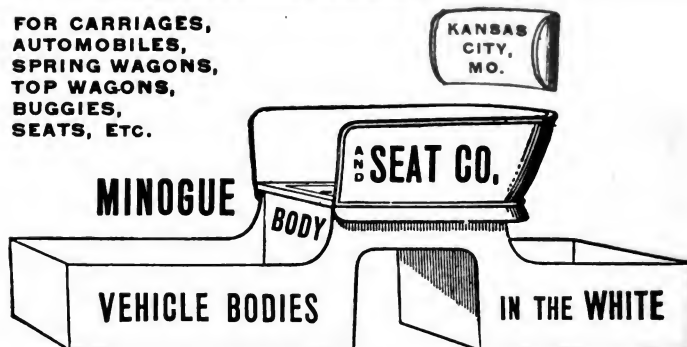
HENRICKS NOVELTY CO.

130 S. Capital Avenue

INDIANAPOLIS, IND.



FOR CARRIAGES,
AUTOMOBILES,
SPRING WAGONS,
TOP WAGONS,
BUGGIES,
SEATS, ETC.



WRITE FOR PRICES

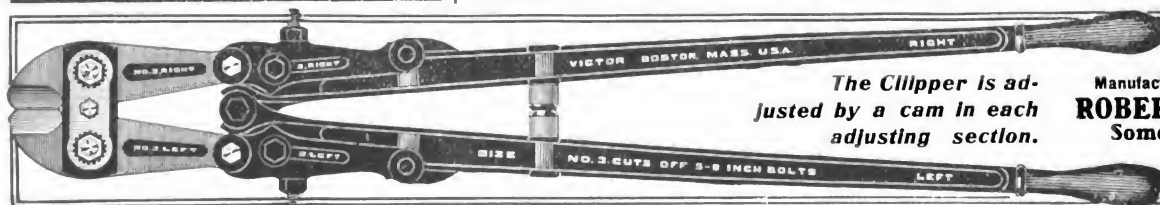
Fac-Simile Letters

FOR Circularizing and Follow Up Systems

Look like the original and bring results. Furnished complete with names filled in or ribbons to match.

LERNER-BEAN CO.,

363 Washington St., BUFFALO, N. Y.



The Clipper is adjusted by a cam in each adjusting section.

BEST MADE SOLD CHEAP

Manufactured under Patent by
ROBERTS MFG. CO.
Somerville, Mass.

Our S. Y. Representative,
Jas. F. McCoy Co.,
157 Chambers Street.

INCREASE YOUR EARNINGS

BRAZING CAST IRON

An opportunity for progressive blacksmiths to make money easily.

LITTLE CAPITAL REQUIRED

We have discovered the method by which cast-iron can be brazed successfully in a few minutes, and are establishing a good mechanic in each section of the country to represent us. Everyone knows that many articles of value, made of cast are being broken daily. They are discarded as worthless and must be replaced by new ones.

This means a loss of much money as the expense of replacing these broken castings is great. In many instances parts of machines are broken, and the machine lies idle waiting for repairs, much time being lost by the delay.

You can prevent these losses by mending broken castings with our compound "**BRAZIT**," and make a big profit on the work. You save the expense of a new casting, and in the case of repairing a broken part of a machine, the expensive delay of having the machine lie idle waiting for the new part.

You can mend broken parts of machines, gears, agricultural implements, pulleys, engines, stoves, automobile parts, sewing machines, lawn mowers, tools, and anything made of cast iron.



A Few of the Many Letters from Satisfied Customers.

SHARON, S. C.
I received the trial set of "Brazit" and can say it beats anything I ever saw. It does just as claimed. I put together a broken piece of cast iron and it was stronger than before it was broken.
C. P. LOWRENCE.

NEW BEDFORD, MASS.
I have mended a number of pieces of cast iron machinery with "Brazit" which have been very satisfactory, saving time and expense, and enabling me to repair pieces which would be very hard to duplicate.
WILLARD N. LANE.

WESTFIELD, MASS.
We acknowledge the receipt of your sample of "Brazit," which we have tried and found satisfactory.
POPE MANUFACTURING CO.

SOUTH DARTMOUTH, MASS.
I have used your compound and it worked O. K. Wish I had had some of it before.
THEODORE BRIGHTMAN.

Will successfully braze cast iron, cast iron to wrought iron, and steel to cast iron, and all the joints will be as strong as before they were broken.

A special equipment is not necessary for this work as it is all done in your forge or with a brazing torch.

Hundreds of blacksmiths are using "**BRAZIT**" regularly, and find it to be a profitable side line. We want you to take up the work in your section. It means money in your pocket. You invest practically nothing, and the profits are large. In order to get you started, we have put up a sample working set, which is complete in every detail. With this set you can braze a number of pieces.

We send this set for \$1.00, prepaid to any part of the world. Fill in the attached coupon and send with \$1.00 today. You can't afford to overlook this chance to INCREASE YOUR EARNINGS.

U. S. BRAZING COMPOUND CO.

(INCORPORATED)

113-115 SOUTH SECOND STREET
NEW BEDFORD, MASS.

A. B.
AUGUST, '05,

U. S.
Brazing Compound Co.
New Bedford,
Mass.

GENTLEMEN—Send me sample set of BRAZIT for which I enclose One Dollar.

NAME.....

ADDRESS.....



"Firestone"

The prestige of the famous **FIRESTONE TIRE** has been steadily growing for years. It is the best known and most admired tire on the continent because it gives such satisfactory service.

It has been said the "**FIRESTONE**" almost "sells itself," and in hundreds of cases it has actually done so because its true worth has won favor in the eyes of the buyer, who buys because he hears the "**FIRESTONE**" is the Tire of all Tires.

Then why not "**FIRESTONE**?"

Attractive Literature on Request.

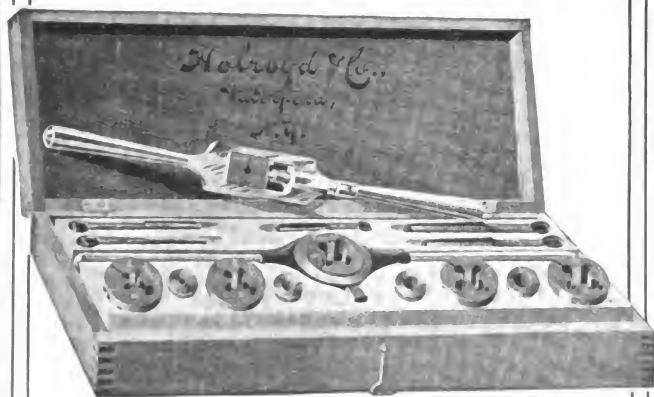
FIRESTONE TIRE & RUBBER CO.

AKRON, OHIO.

New York. Chicago. Philadelphia. Boston. St. Louis.
San Francisco. Los Angeles.

Established 1847

"THE HOUSE OF HOLROYD"



Manufacturers of the Most Perfect Screw Plates, Taps and Dies Attainable. Our Modern Appliances are Noted for their Accuracy and Quality.

HOLROYD & CO.
WATERFORD, N. Y.

European Agents, THE FAIRBANKS CO.,
78-80 City Road, London, E. C.



SOLID RUBBER CARRIAGE TIRES ON REELS



The only long length rubber on the market in 1902 and the most perfectly made today. Write for the Goodyear Red Book, the most complete rubber tire book ever issued. Sent free.

GOODYEAR PADS

NOBLE.



Canvas Back.
Heavy.

PATHFINDER.



Canvas Back. Closed
or Open. Extra
High Heel.

Our pads are the best, because they are correctly made; are made from the best rubber; easy to fit; all are guaranteed.

EASY.



Leather Back.
Heavy.

DREXEL.



Canvas Back.
Regular.

The Goodyear Tire & Rubber Co.
AKRON, O.

BRANCHES:

BOSTON NEW YORK CHICAGO
CINCINNATI ST. LOUIS
DENVER MINNEAPOLIS

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

AUGUST, 1905

NUMBER 11

BUFFALO, N. Y., U. S. A.

Published monthly at 1338-1334 Prudential Building, Buffalo, N. Y., U. S. A., by the

American Blacksmith Company
Incorporated under New York State Laws.

Subscription Price:

\$1.00 per year, in advance, postage prepaid to any postoffice in the United States, Canada or Mexico. Price to other foreign subscribers, \$1.25. Reduced rates to clubs of five or more subscribers on application. Domestic long-time rates: Two years, \$1.60; three years, \$2.00; four years, \$2.50; five years, \$3.00; in advance. Single copies, 10 cents. For sale by all foremost newsdealers. Agents for Great Britain and Ireland, J. W. Jackman & Co., Ltd., 39 Victoria St., London, S.W.

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Duly entered as second-class mail matter, at Buffalo, N. Y. Act of Congress, March 3, 1879.

Requests For Pink Buffaloes.

Subscribers should not hesitate to send in for a fresh supply of pink stamps. Every letter you write should carry one of the herd. When your correspondence bears one of these stamps, it signifies that you are protected by a clean trade journal that demands best treatment for its readers. The blacksmith needs this protection and should avail himself of it at every opportunity. Your letters will receive prompt and better attention by using these stamps freely. Don't wait till your supply is entirely run out. If you have only a few left, send in your request for more today.

Live and Let Live.

The object of this editorial is to call the attention of our readers to the narrow policy of certain catalogue houses throughout the country and to point out the manner in which these concerns threaten to demoralize the craft if prompt action is not taken on the part of the smith. Spirited competition is found in all branches of trade. All men have equal rights in trying to make an honest living, but at the same time certain protection is due the tradesman and when competi-

tion assumes such a form as to seriously interfere with and threaten a man's very means of livelihood, then indeed it is time to call a halt.

We are frank in saying that we strongly disapprove of the practices of catalogue houses of advertising and selling blacksmiths' kits to farmers and other horse owners not connected with the blacksmithing craft and the concerns that persist in doing business along these lines advising private parties to do their own shoeing and repairing surely do not merit the patronage of our readers. It seems that the firms who are circularizing the farmers as described above, find a most fertile field for such operations in rural districts and have naturally caused the country smith no little trouble. The country blacksmith must depend upon the farmers' trade for his living, and if these supply houses advise the farmer to do his own shoeing, etc., then they are doing nothing less than practically forcing the blacksmith out of business. Time and again we have received letters from our subscribers complaining that certain parties in their neighborhood have purchased blacksmiths' tools and have set up an anvil. Surely we cannot allow this state of affairs to continue without strong protest on the part of the smith. Our readers will readily see that the ultimate results would be most detrimental to the craft, and these conditions present a field for much conscientious thought on the part of every man with the interests of the good old trade at heart. Are you going to stand by and see the standard of the craft lowered in this manner? What action will you take to check the procedure of these evils? If we permit the catalogue house to continue educating the farmer to take up smith work, where will the craft be in a few years hence? Indeed, this is a question that demands immediate attention. One good remedy lies in the agitation and passage of such laws which will require a man to pass a certain examination before being permitted to practice horseshoeing.

There are laws prohibiting outsiders from exercising the duties of other trades and professions, and our friends will agree with us that legislation of this nature for the craft is in order.

The catalogue houses that persist in advising the farmer to do his own shoeing, should, in no way, be encouraged by the blacksmith. At times it would seem as though the offers made by these concerns are somewhat generous, but before sending his order, the smith should consider whether or not it is to his best interests to do business with firms who have adopted so narrow a policy as outlined above.

How Readers Help.

Our readers have been very generous of late in contributing interesting articles for the paper. It is especially gratifying to us to note this increased active interest on the part of our friends, for we want subscribers to feel that the journal is published for them. Too many trade journals make the advertiser instead of the subscriber their primary consideration, and we encourage our readers to write articles for our columns, for THE AMERICAN BLACKSMITH is for and by the smith.

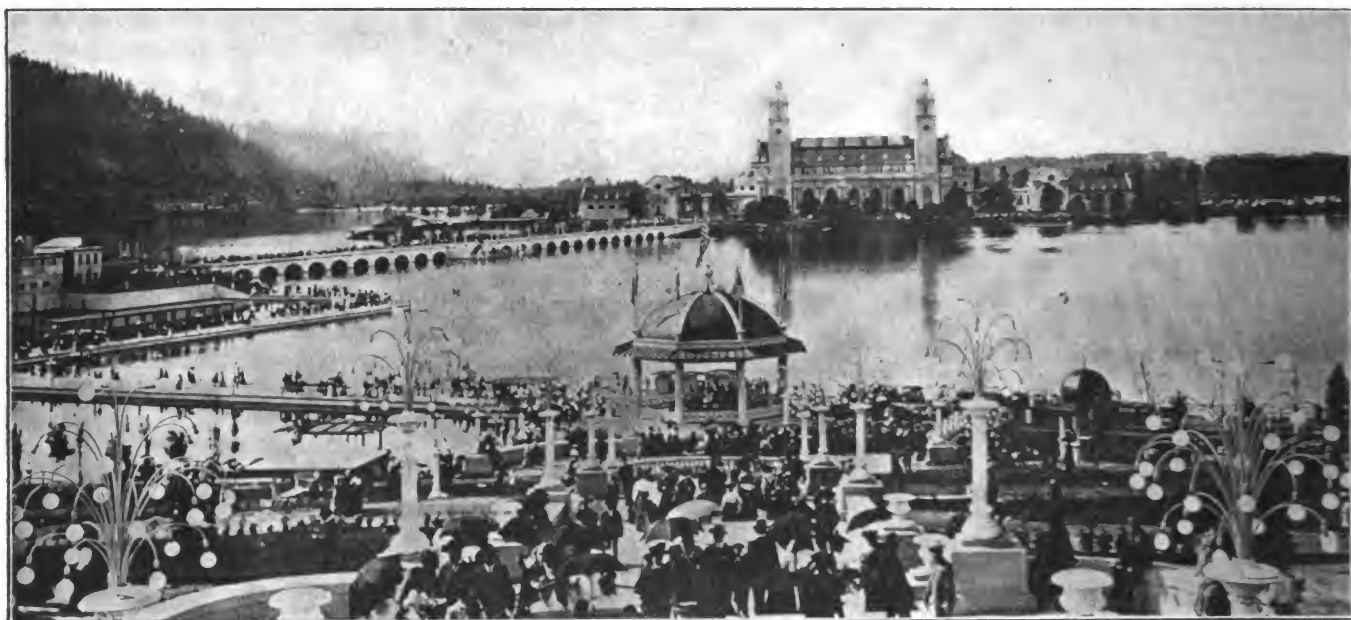
There is a certain class of readers whom we hear from regularly. In their letters they either give their opinion on a certain article or criticise a statement that appeared in the paper, or probably answer the question of some brother smith, but they feel it their duty to be represented in some manner in the journal and this is the light in which our readers should look at this matter. But while certain smiths take pleasure in contributing from time to time, there is, on the other hand, another class of readers who have been taking the paper for years, enjoying the articles written by their fellow craftsmen, but have never been represented in the paper by a single line and to such smiths this article is especially directed. It seems to us that when we gladly open our columns for the discussion of up-to-date craft topics that every subscriber

should feel duty bound to take part and give his own personal views on the subject. The smith should be willing to do his share in getting at the bottom of these discussions and in helping us solve these problems for the general good of the trade. It is a duty you owe your fellow craftsmen to give your opinion of the articles you read in the paper. If you do not agree with the writer and know a better way to do the job, why not send it in for publication? Or if you can answer the question of some reader and tell him how to overcome the difficulty he has encountered, do not hesitate to do so. We are frank to say that as a rule the smith is very liberal-minded in cases of this kind and is generally ready to help his neighbor, but it seems a somewhat difficult matter

days. Headquarters will be established at the Forest City House. All arrangements have been completed and every foreman blacksmith, whether a member of the association or not, will receive a hearty welcome and is earnestly urged to come and help the good work along. For the entertainment of the ladies, an excellent program has been arranged and as in former years, a large delegation of the gentler sex is expected. A trip to the Collinwood shops of the Lake Shore Railroad is also planned. The committees in charge of the various topics to be brought before the convention are thoroughly prepared and will submit papers upon the following subjects:

Oil Furnaces.
Ideal Blacksmith Shop.

interest him. Nevertheless, it is the experienced visitor who seems to find the keenest delight in the Portland fair, for he knows how to enjoy its points by comparison. As to size and overwhelming magnificence, of course, he makes no comparison. Portland never has claimed superiority in the matter of mere bigness. But when the old-time exposition visitor comes to Portland and finds the Forestry building looming up before him, like a rough-hewn cathedral in the heart of the forests, he is likely to exclaim: "Now, that's something worth seeing. I never saw anything like that, and I thought I'd seen it all." When, to use the current slang, he goes down the grassy slope of Centennial Park and "hits the Trail," most of it built on piles and



A GENERAL VIEW OF THE PORTLAND EXPOSITION, LOOKING ACROSS THE LAKE FROM THE TERRACE.

to persuade some smiths to express their views in writing.

We trust that those subscribers who have never sent us an article for publication will, after reading these lines, resolve to do their share in maintaining the high standard of *THE AMERICAN BLACKSMITH* and resolve to contribute at least one article a year to their favorite journal. Some of our friends make it a point to send us an article when they pay their subscription and we should like to see more of our readers adopt this plan and be represented.

The Coming N. R. M. B. A. Convention.

The next annual convention of The National Railroad Master Blacksmiths' Association, which is to be held at Cleveland, Ohio, this year, will open August 15 and will continue for three

Tools for Steam Hammers.
Forging Machine Formers, Etc.
Spring Making and Tempering.
Best Material and Methods of Forging Motion Work.
Manipulating Tool Steel, Including High Speed Varieties.
Best Methods of Repairing Locomotive Frames, Both Iron and Steel.
Best Methods of Testing Materials and Selecting Same for Uses Intended.
Full particulars regarding the convention may be had by addressing the association secretary, Mr. A. L. Woodworth, at Hilburn, N. Y.

The Lewis and Clark Exposition at Portland.

The exposition visitor who has been to Paris and the rest of the big fairs may imagine that he has seen so much that Portland has nothing to offer that will

planking, far out over the waters of a lake, he is impressed with the idea that here is another novelty, whatever may be the character of the shows he will find; for in selecting a location for the Trail these expositionists surely outdid the rest of the earth in originality and boldness. Not even the seashore, where long fishing piers and boardwalks and pavilions built above the breakers are familiar features, has anything to compare with the Trail, this Venetian vista of pleasure-houses with water all around and underneath.

While the person who has seen many big fairs finds several notable things here to arrest his attention and give him sensations, it is, after all, the average citizen of the Far West who really profits by the exposition. To him and his wife and their little ones this Lewis

and Clark Centennial is the very first exposition; they were too far from Chicago, Omaha, Buffalo and St. Louis to make the trip to either of these towns. But this is their own show, and they propose to see it to the utmost. There is a curious fact about travel in this section of the country. While the average resident of the Pacific slope seldom goes beyond the Rocky Mountain range, he thinks nothing of a trip of a thousand miles or so in his own section; and thus it happens that people are flocking to this exposition from far-off points in Montana, Wyoming, Idaho, Utah, Nevada, California—scores of them from Los Angeles, which is 1,300 miles away. During the first three weeks of the exposition more than 1,900 actual residents of California

and early fall. Generally speaking, the exposition is almost as much of a novelty to the Easterner as to the Westerner, though in a different way. The visitor from the East finds opportunity here to study far western conditions, to see the wonders and peculiarities of a region which heretofore has been to him merely a vague vastness off in the northwest corner of the map. At the exposition he finds an epitome of the whole Pacific West. If he pays proper attention to the details when he procures his transportation he may, at a limited expense, see the actual West in large quantities by coming along one route and returning by another.

The exposition people have just established at Seattle, San Francisco and Los Angeles, bureaus of information, in

tages are fitted with fireplaces, and a fir-wood fire is a helpful adjunct nearly every evening. The people of the middle and eastern States find it difficult to believe this when they see it on paper, but they will discover the truth about the delightful summer coolness of western Oregon when they visit the Western World's Fair.

The Transportation, Electricity and Machinery Building at Portland.

The longest building at the Lewis & Clark Exposition is that devoted to transportation, electricity and machinery, its dimensions being 500 by 100 feet. The Transportation, Electricity and Machinery Building is situated in the extreme eastern portion of the exposition grounds and has for its



LEWIS AND CLARK EXPOSITION. THE MACHINERY, ELECTRICITY AND TRANSPORTATION BUILDING.

registered their names and addresses in the California Building at the Fair.

To the far western people the Lewis and Clark Exposition presents so many points of novelty that the visit marks an epoch in their lives. The United States government section is particularly interesting to them. For the first time they have an opportunity to see the immense and dignified side-show prepared by Uncle Sam for all his children who may be able to get to the place of exhibition. The government has brought here approximately 80 per cent. of the exhibits which it showed at St. Louis, and in addition to these there is one whole pavilion devoted to irrigation, a subject of intense interest to all the West.

The bookings at the Portland hotels and lodging houses for the coming weeks indicate that the East also is interested in the exposition. Thousands have come, and more thousands will be pouring in during the summer

charge of men who have been connected with the fair for months. These bureaus are to aid the tourist in getting the most out of his trip to Portland, by telling him what there is to see along the route, at the fair itself and in Portland and its vicinity, and how best to see it without wasting all of their time and energy.

People now in Portland read nearly every day of sweltering heat "back East," which means all the way from western Kansas to the Atlantic seaboard. Such a thing as a really hot day in Portland is unknown, and a night when it is comfortable to sleep without double blankets never visits this region. There is absolutely no humidity. Most people have been wearing light wraps when visiting the Exposition in the evening; and the native Portlander has no comprehension of the verb "to swelter." At the seashore, a hundred miles from Portland, the summer cot-

neighbors the Mines and Metallurgy Building and the Auditorium.

Owing to the fact that the construction of this building was found necessary only within very recent date much effort toward design was not permissible and the facades are plain. Notwithstanding, they have been so carefully studied that the building is one of the most presentable at the Exposition.

Ornate work is confined almost entirely to the main entrance, which is located in the center of the west facade. This has a large arch richly ornamented with two pilasters, one on either side of the doorway. A cornice of liberal projection supported by classic brackets and festooned with sculptured flowers ornament the entrance, which is exceedingly attractive.

The upper wall of the pavilion is finished in a semi-circle adorned in the center with a star-shaped window and on each angle is a pinnacle supporting a

flagpole. Two doors on the main facade and one on either end of the building afford ample means of entrance and exit for the large crowds.

Two wings, each 100 by 100 feet, made necessary by the remarkable demand for exhibit space, extend at right angles from either end of the main building. The cost of the Transportation, Electricity and Machinery Building aggregated \$30,000.

In this building are housed many interesting displays. The transportation exhibit shows the different modes of travel from early days to the present time, from the baby carriage to the

power and its application. Displays are also made of electro-chemistry, lighting, telegraphy and telephony and many other fields in which electricity is utilized.

The machinery exhibit is classified under steam engines, various motors, general machinery, machine tools and arsenal appliances.

Wheel Height Standards Adopted.

The farm wagon trade throughout the country are aware that the manufacturers have been endeavoring for some time to find means of dispensing with some of the useless variety of

commended it heartily, it has not met with a single objection from the retail dealers who have considered it by articles appearing in the trade papers throughout the country.

Numerous letters of interest and appreciation have come voluntarily from manufacturers of wood and iron materials, machinery, and in fact the allied trades generally; nothing heretofore undertaken by the association for the benefit of the trade and manufacturing conditions has met with such universal approval.

The following heights, measured without tire, have been adopted as standard:

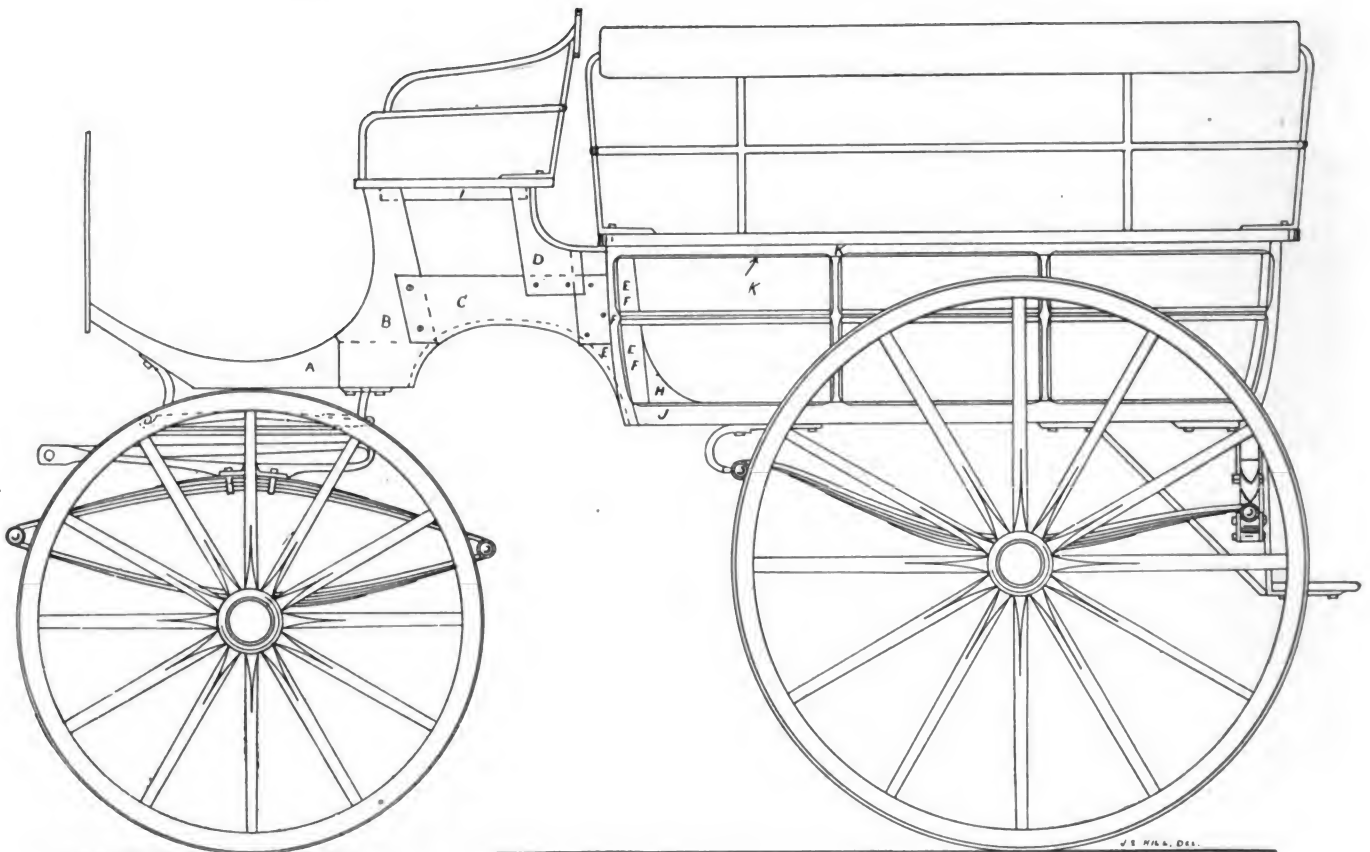


Fig. 1.—SHOWING SIDE ELEVATION OF WAGONETTE.

steam mogul engine. A feature of the transportation section is the first locomotive used in Oregon. It is a pony engine only thirteen feet long and seven feet wide. It stands next to one of the largest and latest patterned locomotives constructed in the United States and the contrast is vivid. Aside from the many exhibits showing the mode of travel on land, many exemplifications of sea travel are included in the transportation display.

The electricity and machinery displays are full of life and motion, showing the wonderful progress made in late years in these lines. The electricity exhibit includes exhibits of various contrivances for the generation of the

detail in wagon parts and to bring about sensible standards that will benefit the jobber, dealer, and consumer, as well as themselves, as the admitted evil of ever increasing variety is constantly adding to the expense and inconvenience of all.

The height of wagon wheels for one and two horse wagons as used on farm and mountain wagons, header and farm trucks, but not log or special wagons, was first considered and after a thorough canvass of trade and selling conditions as well as practicability, among not only wagon manufacturers, of whom 91 out of 94 gave the proposed change their unqualified approval, but also the jobbers from Coast to Coast who have

Front Wheels	44	rear wheels	52 inches.
"	"	4C	" 48 "
"	"	40	" 44 "
"	"	36	" 44 "

These heights possess every desirable advantage in strength and ease of draft, also the same gears will interchange on three of the heights.

After July 1st, 1905, these heights will be furnished the trade by the various factories as quickly as their shop conditions will permit, but as the materials for the old heights will in many cases work for the new it is expected that the new will be furnished the trade generally during the year 1906 and perhaps in many cases before.

The adoption of these standards is going to permit the manufacturer to get

his wheel materials, both wood and iron, with less delay and will enable him to supply his trade more promptly. It will also benefit the jobber and dealer in requiring them to provide less storage space than heretofore and in reducing their investment in wagons. With the consumer the benefit will be felt by reason of his wheels being standard any place in the country so that repairs can be readily and economically obtained.

This change being made in the gradual manner proposed need cause no disturbance in stocks now being carried, but with all concerned will be made effective because of the money value attached to the economy of it and the convenience and saving of time. The encouragement given this first attempt to bring to reasonable standards such important parts as wheels (of which there has been so great a variety) no doubt will lead to similar undertakings in other directions for the mutual benefit of the manufacturer, his customers, and the consumers.

The association greatly appreciates the assistance afforded them in this effort by the trade press and all others who have aided in making it possible.

NATIONAL WAGON MFRS' ASSOCIATION,
E. W. McCullough,
Secretary.

Plans for the Making of a Wagonette.

J. LAWRENCE HILL.

The accompanying engravings are plans for the making of a very easily built wagonette. Besides the utility for passenger traffic, it is admirably adapted for freight if so desired. The side seats can be so attached to the body that they will be easily removed, leaving a large space for carrying goods of various kinds.

The side elevation, Fig. 1, besides giving the length and height, shows the disposition of the framing with the various joints. The boot is the first to frame up, as the panel must be glued on before it can be attached to the body proper. By referring to the half plan, Fig. 4, we see the boot is parallel, that is, it is the same width at the toe as at the body. Therefore all the timber can be gotten out straight and square. Patterns should be made from $\frac{3}{4}$ or $\frac{1}{2}$ -inch panel ends for all but the straight pieces and a $\frac{3}{4}$ -inch hole bored through each. When finished with them, fasten together with a good cord and hang up for future use. The pieces marked A, B, C, D, I are $1\frac{1}{2}$ inches thick, but E is of $1\frac{1}{4}$ -inch stock. The reason for this extra thickness is, that it is never considered good

construction to fasten two pieces of hard wood together with a soft piece between. Hence the boot panel only goes under the corner pillar F half an inch. See Fig. 4. In Fig. 1, E and F may be a little confusing as they appear on the same piece. This is because their inside lines, as viewed from the side, correspond. This is made clearer in Fig. 4. The piece B is lapped from the inside into A, C into B from the outside, E into D from the inside and D from the outside into C and E, while I fits from the inside. These pieces should be well screwed together after the glue is dry, clamps being

corner pillars are $2\frac{1}{4}$ inches thick on top and tapered to $1\frac{1}{4}$ inches on the bottom. This variation is made necessary because the boot has not so much flare as the side. The section marked X, Fig. 6, shows how the center standards are let into the sill and top rail. Don't forget to cut the shoulders of the tenons by the same bevel as the one used to dress up the sills. The corner pillars with a section showing the rabbet for the panel is shown at W, Fig. 6. The bottom mortice and tenon are shown in Fig. 4. By using this method no end grain is shown, a feature always to be sought and obtained, besides which a good

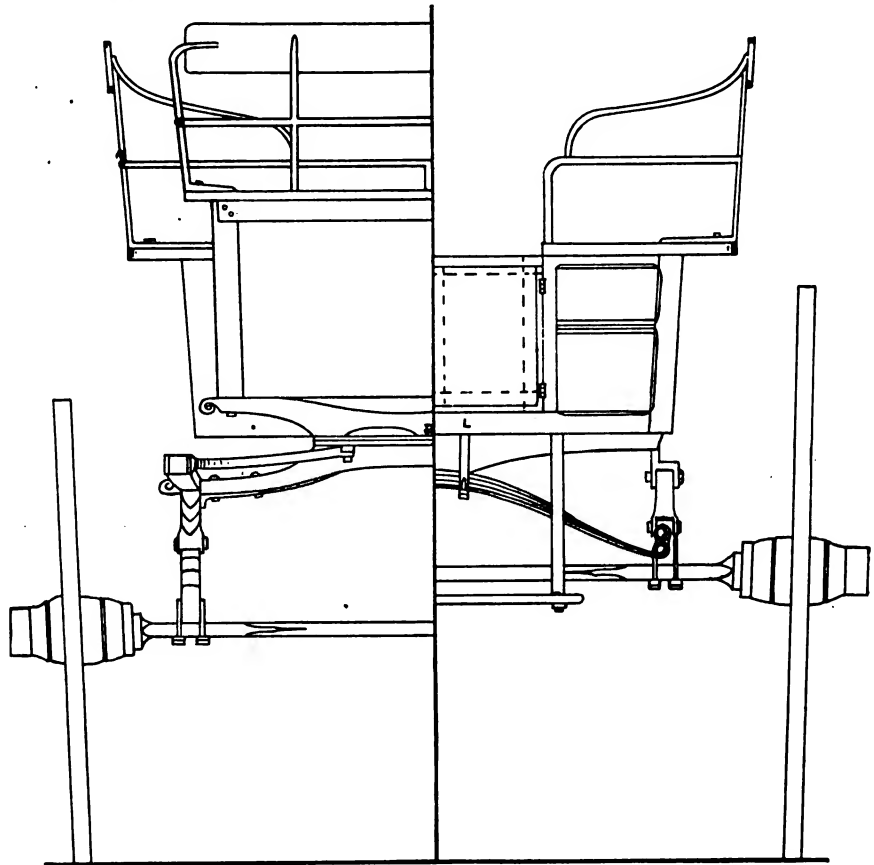


Fig. 2. HALF FRONT PLAN OF WAGONETTE.

Fig. 3. HALF REAR PLAN OF WAGONETTE.

used to hold them until then. When screwed, glue a $\frac{3}{4}$ -inch panel over the entire boot, using nothing but the very best glue, well prepared.

The half back, Fig. 3, will give the inclination of the body sides outwards. This is known as the flare. The sill, J, Fig. 1, is straight but not square, as it must be on the same flare as the sides. The gauging for the pillars and standards is done from the face side and if these do not all come true and alike there will be trouble. The two middle standards are dressed up squarely $\frac{3}{4}$ by $\frac{7}{8}$ of an inch. The back corner pillars are shaped on the side as seen in Fig. 1, and $1\frac{1}{4}$ inches thick. The front

connection with the sill must be had.

After the frame is all fitted, glue the corner pillars and standards to the sills, placing the top rail K, Fig. 1, temporarily in its place. Fit in H, which is to enable the blacksmith to put a good corner on the rocker plate. Remove the top rail and fit a panel into the groove in the corner pillars. Glue on top rail and screw panel to the standards. At Y, Fig. 6, is shown a section of the moulding which goes in the center of the panels. This is fitted between the standards and pillars and is screwed to the panel from the inside. In Fig. 2, the half front view, is shown the outside line of boot as compared with that

of the body. It is only inclined outwards $\frac{3}{8}$ of an inch on each side. This accounts for F being thicker at the top than at the bottom. In Figs. 3 and 4, the pieces marked L are the cross bars. These should be fitted before the rocker plates are made, and should be the next thing to have done. They should be $2\frac{1}{2}$ by $\frac{3}{8}$ inches where possible. In other places it should be as wide as the framing will allow. Screw the plates on firmly. Then set the job up,

bed, a stay is bolted which goes up to 1 and 2, the object being to brace together and stiffen the fifth wheel at these points. The top bed is straight in plan, with the shape in elevation as shown in Fig. 2. A piece of wood $1\frac{1}{2}$ by $\frac{1}{2}$ -inch is mortised through the center and then finished outside the fifth wheel with a scroll.

The principal measurements are as follows: Length of side seats, 51 inches by 15 inches wide; door, 17 inches wide,

for by so doing you will save your customers money and establish for yourself a reputation for fair dealing. So I say *don't* recommend extensive repairs on any old vehicle for the sake of securing a job that will net you a goodly sum of money. You may say this is a trifling matter, but it is not, and a customer will respect a man who tells him the truth even if he is disappointed. Any repair man who understands his business can tell at once by looking over a job

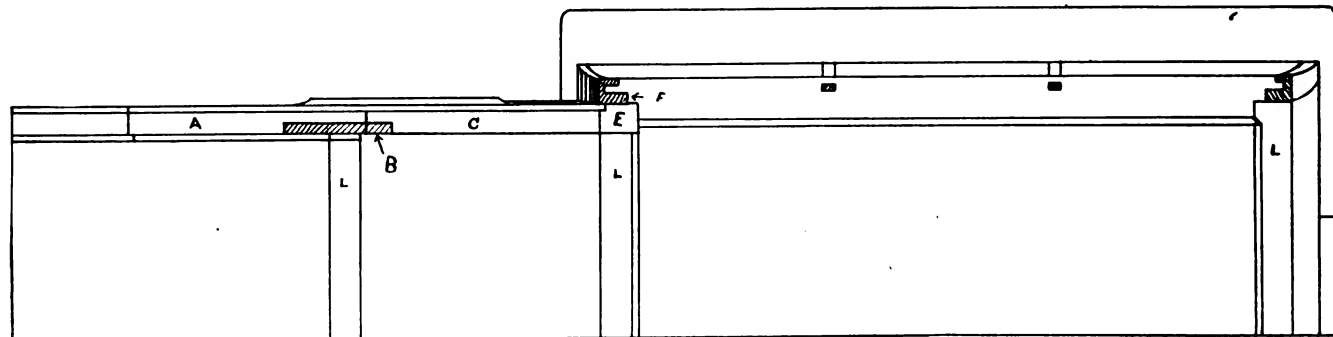


Fig. 4.—SHOWING HALF BOTTOM PLAN OF WAGONETTE.

putting all cross bars in wheel-house and neck panels. Then frame the door pillars into the back cross bar and finish back same as sides.

The door is easily made by lap joining the framing and then gluing the panel all over it. After the door is hung and fitted, screw a brass moulding, Z, Fig. 6, on the bottom and sides. At the top, brad a wood moulding. The door is completed by putting a lining board on the inside for the benefit of the trimmers. To make a good job of the seats they should be framed up and rabbeted out to receive a $\frac{3}{8}$ -inch panel between the sides. This method is far superior to a solid board seat. The rails on seats are made from $\frac{1}{2}$ -inch round iron welded to form one solid piece, to the top of which the lazy back is attached.

A top plan of the bottom half of the front gear is shown in Fig. 5. The piece

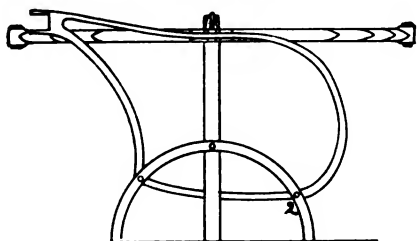


Fig. 5.—SHOWING DETAIL OF FRONT GEAR.

1—2 is 1 by $\frac{1}{2}$ -inch iron, which is put through the bed. From 2 to 1 is one piece. This does away with the need of a wood block where the pole or shafts fit in and makes a compact and neat looking fore-carriage, the writer having seen one recently. Underneath the

making a total width outside seats of 47 inches; length of body on the bottom, 49 inches by $36\frac{1}{2}$ inches wide; width of boot on the bottom, 32 inches; height of boot, $15\frac{1}{2}$ inches; front seat, 28 inches by 15 inches; depth of body, 14 inches; rear axle, $18\frac{1}{2}$ inches forward from back of body. This places the spring bolt out of the center 2 inches back. The back side springs are 39 by $1\frac{3}{8}$ inches and have 5 plates; front springs, 36 by $1\frac{1}{4}$ by 4 plates. The springs are 36 inches apart on the axle. The wheels are 3 feet and 3 feet 9 inches with $1\frac{3}{8}$ -inch spokes and $1\frac{3}{8}$ -inch tires. Axles are $1\frac{1}{4}$ -inch front with 1 5-16-inch rear, half patent. The body is hung 32 $\frac{1}{2}$ inches at the back and the width of the track is 4 feet 8 inches.

The perspective view of the finished vehicle, Fig. 7, will give a good idea of how it ought to look when completed. For painting and trimming most any color scheme can be used. For general taste a good green, body lighter than the gear and both striped a light green, with black mountings, such as hub bands, single tree hooks, steps, seat rails, etc., will be found one of the best stock colors to have.

A Few Don'ts For Wagon and Carriage Repairers.

GEO. W. HOPKINS.

If you will permit me I will reverse the order generally followed and tell a few things that ought not to be done. The first *don't* that I will give relates to all classes of work and one that all who hope to succeed as repairers should heed,

whether it is in such shape that a complete overhauling will make a good job of it, or whether it would be best to prolong its usefulness for a short time with a few repairs, where they would do the most good. Always recommend what is best for your patron and you will gain in the end. To illustrate, a man brings you a platform wagon, the platform is in bad shape, the circle is bent, the bases and trusses are bent or twisted out of shape and the wood parts are

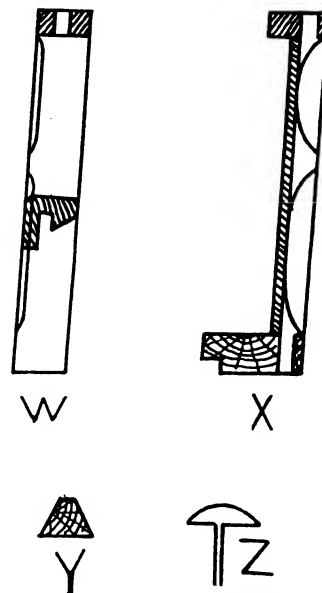


Fig. 6.—DETAILS OF CONSTRUCTION.

worn at the joints so that it will cost nearly as much to repair it so it can be used as it will to build an entirely new platform. Do not repair it, for it will soon give out in some other place, but

persuade your customer to let you put in a new platform if the springs and axles are worth it. If it is not worth fixing, tell him so plainly even if it does mean the loss of a job that you might have had. You will be the gainer in the end by this method.

Don't use a spoke that is sprung, although you may straighten it. It will spring back again and spoil the looks of the wheel. It is always the toughest timber that springs and warps out of shape, and there is no need to throw it away as it makes the very best of dowel pins and we need these in the shop every day.

Don't allow a job to leave your shop without looking it over to see that all bolts and clips are tight.

Seasonable Styles.

The Latest Fashions in Colors and Striping. Fashions of the City Influence. Those of the Country. All the Smart Effects Touched Upon in Detail. The Small Shop Painter Should be a Student of Modern Styles.

M. C. HILICK.

Fortunately the American carriage painter does not depend wholly upon Paris for what we may term seasonable

as applied to the lighter build of pleasure vehicles.

The colors chiefly employed in painting road wagons of the light type, and the light class of buggies, do not differ materially from those largely employed last season. Of the more popular colorings, black bodies, without striping, predominate. In case stick seats are used the spindles at the center are picked out with red, or with whatever color is chosen for the running parts. For running parts, red, which includes number 40 carmine, 20th Century red, Armenian red, Aurora red, Crescent red, Metropolitan red, and a long list of other equally brilliant reds, is the favorite. These colors are being striped, as a rule, with two and three hair lines of black or with exceedingly fine lines of gold. Dainty lines of light English primrose, chamois yellow, Naples yellow, light or cream color are also much in evidence, and if the lines are artistically placed and drawn with accuracy the effect is exceedingly "smart." Some speeding wagons, of which the village painter gets comparatively

even aluminum, together with a wide choice of a half hundred or more of the modern popular reds.

The class of buggies known particularly through the country as "family buggies," of which 9 out of 10 farmers own one, are painted with black bodies, generally speaking. The elaborate striping of the bodies, which for the past two or three years has been a marked feature of the painting of this class of work is fast becoming obsolete in the eastern section of the country, at least. A rich, black body, nicely finished, speaks for itself and cannot be out-classed or even surpassed among connoisseurs. Running parts are being painted black, some of the dark fine greens also being extensively used, along with all shades of red from the most brilliant to the deep, unobtrusive shade. Wine color of the medium shade, carriage part lake, light and dark, chatamuc lake, geranium and maroon lake, are also being considerably used this season, and they make an altogether useful and handsome array of colors, with a brilliancy and depth

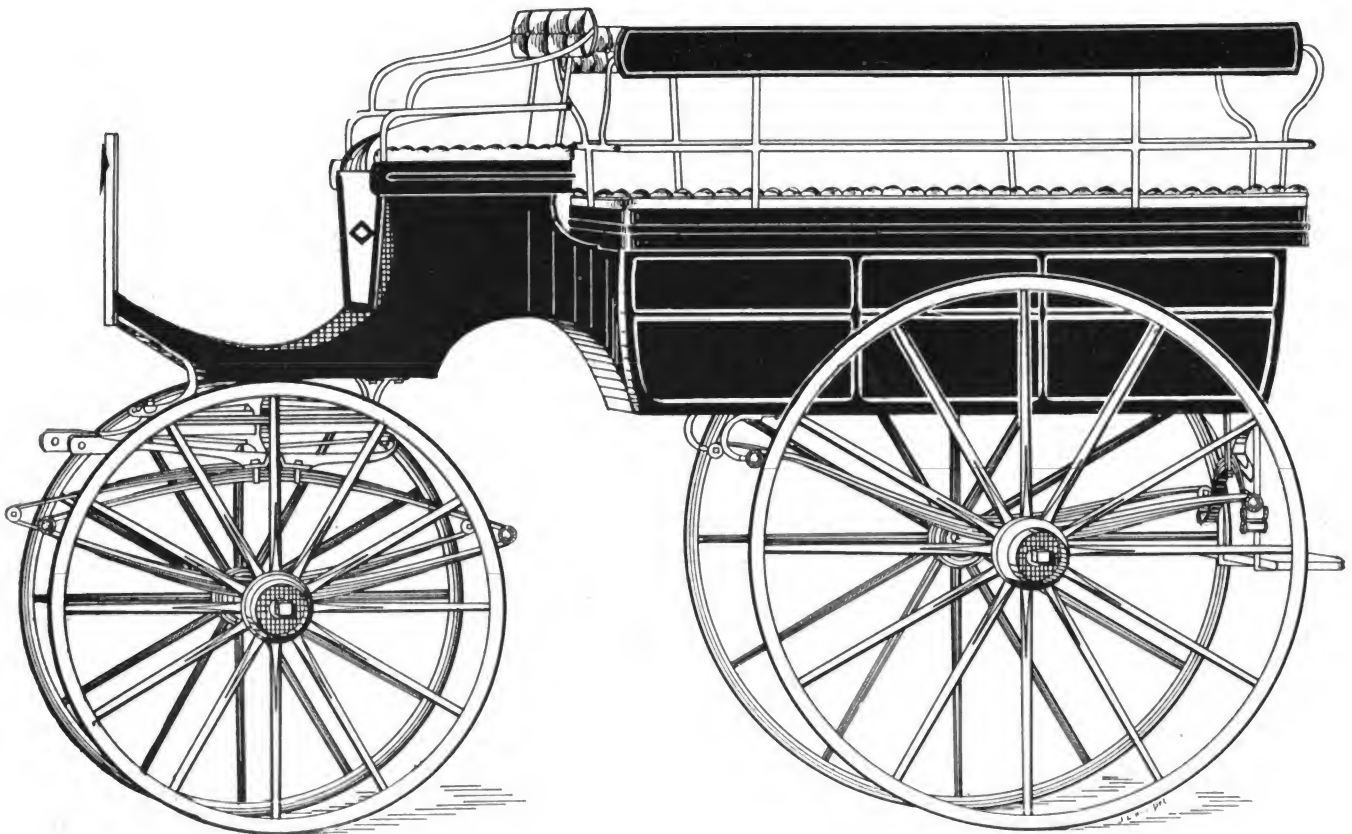


Fig. 7.—PERSPECTIVE VIEW OF FINISHED WAGONETTE.

styles in carriage painting. To a very great extent carriage painters on this side of the Atlantic are originators and creators of painting styles, especially

EDITOR'S NOTE:—This is the fifth article of Mr. Hillick's series. The next "Hints," will give many facts and formulas especially adapted to the small shop.

few to paint, show primrose and canary yellow, 20th Century yellow, permanent yellow, medium and chamois yellow, with perhaps a sprinkling of the deeper toned yellows. These yellows, for the most part, are striped with fine lines of black, gold, and

of color that catches the fancy of the vehicle-using public.

For cabriolets, phaetons, surreys, vehicles which rural residents are owners and users of to a large extent, the dark aristocratic colors are most in order. For the bodies the seat panels

are largely painted dark green or blue with moldings black. Running parts are usually painted lighter shades of the green or blue and striped with black or gold lines, carmine, aurora red, Flamingo or Armenian red and occasionally Indian red, the latter being drawn with hair lines of color. Phætons are being mostly striped with double fine lines, while the cabriolets and phætons show three lines, usually a $\frac{1}{8}$ or $\frac{3}{16}$ -inch line of black with distance fine lines of the same color or with some of the many popular reds.

Platform, or, as they are often called in the country, "democrat" wagons, are usually painted with black bodies and seats, and running parts black or some

ultramarine, Richelieu, coach painters' blue, dark and cobalt blue, are also in high favor with the users of the brougham and landau and rockaway class of carriages. The running parts are usually painted in a lighter shade of the same color used on the main panels of the body. Panels of body are rarely ever striped. Moldings, however, are commonly striped with a single line of dark red, or whatever color the running parts are striped with. Maroon, in some cities, heads the list of fashionable colors for main panels of the landau and broughams, but maroon has fallen off decidedly in popularity as a heavy vehicle color the present season.

In the painting of park wagons, traps,

Business wagons, of which the village and country painter is certain to get a share, with an increasing share if he succeeds in furnishing city styles in striping and coloring, are painted in all imaginable combinations of colors. From Tuscan red to English vermilion and on through the list including Flaming red, Brewster, Cortland claret, Flamingo, Aurora and a mighty company of other remarkable shades of the same family, one reaches the yellow pigments to find all the old time and the modern yellows in large use, with perhaps canary yellow, straw color, primrose yellow, sulphur yellow, 20th Century yellow, Celestial, chamois and olive yellow in the lead.

The browns are also largely used in painting business wagons, and among such pigments none scarcely gives a smarter single panel effect than Italian burnt sienna. For the paneled top wagon carrying a depth of color that separates it from the vehicles painted with direct reference to the power of the color, or combination of colors, to attract attention and possibly advertise the owners' business, the blues from the most brilliant to the deep, dark shades are largely employed, and concerning the greens one might write in a similar strain. On business wagons, too, you may see wine colors bearing such titles as bright wine, medium, deep, extra deep, strong and rich maroon, with many of the more permanent lakes interspersed. Among these lakes is the old and tried carriage park lake, number 40 and coach painters' carmine, geranium, Munich and Chatamuc lake.

There is scarcely any restriction upon the employment of colors for the modern business wagon, so long as harmony of effects is obtained. The business wagon has come to be regarded quite as much as an advertising medium as a conveyance for the delivery of goods and with this purpose in view the painter cannot well go far wrong if he chooses combinations verging at times upon the sensational sort. The purpose to which the vehicle is to be put should control—in fact, does control—the color scheme employed. In the matter of striping and lettering the choice of colors, etc., should depend upon the color of the panel to which the striping is to be applied, or at any rate, upon the general color scheme fitted to the vehicle as a whole.

The yellows and bright reds take kindly to aluminum striping and ornamental effects, and aluminum letters, etc., whereas the darker colors, including



LEFT HALF OF GATEWAY PRESENTED TO DENVER BY MR. MCLELLAN.

of the dark, fine greens, wine colors, and dark lakes. In case of black or dark green running parts, number 40 carmine or gold bronze striping effects are very much used, while the wine colors and lakes may be striped with black and gold lines.

A plain gold or carmine stripe around the top and bottom of the body is much used in some sections, and it gives relief to the color and makes the finish a bit more conspicuous. In the heavier class of pleasure vehicles, which includes landaus, broughams, rockaways, etc., dark, aristocratic colors are most in evidence. Quaker, Brewster, bottle, 20th Century, olive, onyx, dark Merri-mac and other less known, but none the less notable greens are prominently in evidence upon the main panels and running parts of these vehicles. The blues, which include 20th Century, Prussian,

breaks, coaches, etc., the list of colors enumerates a wide variety of pigment. Among the colors which find much favor with users of these vehicles are such browns as olive, Dan Dyke, amber seal, golden, onyx, royal, and others of the brown family of colors. These browns, all in deep shades, give rich, summery effects, and striped with gold, and black, and some of the pale yellows—primrose and chamois yellow, for example—they yield charming effects. Dark, rich reds, yellows touching all the tints from light to medium, brilliant blues, and greens of the finest, with some of the most beautiful lakes, constitute the array of colors used in painting park vehicles. The striping effects are not "loud," but chosen with especial reference to harmony and illuminating capacity. Two and three line designs are much used upon this class of vehicles.

the dark reds, black, blues, greens and browns, etc., are best lettered in gold, and striped in gold and also such other colors as help to display the chief charm of the ground colors.

A Blacksmith's Gift to His City.

The gift in question is a beautiful stone gateway, the recipient Denver, Colorado, and the donor Mr. W. W. McLellan, a retired railroad smith.

Mr. McLellan, who is nearly seventy years old, learned the smithing craft at the age of twelve. When barely past the twenty-year post he was made foreman of the Kansas and Pacific railroad shops and later the Denver and Rio Grande, where he worked for twenty-one years. He retired to private life three years ago after spending over a half century at the forge. Since retiring, Mr. McLellan has travelled over the country reaping a just harvest of rest after his long term of service at the anvil.

The gateway, a picture of which is shown, is at the entrance of Denver's principal park and is a massive and superb stone structure. The lamps, one on each column, are masterpieces of the art smith's work. This gateway represents a gift of \$15,000.

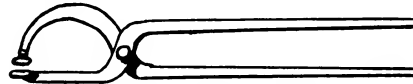
Parks, it may be said, are Mr. McLellan's hobby, as to him belongs the distinction of opening Denver's first park. He was also the means of securing the land for the park in which his gateway now stands. Mr. McLellan also helped very materially in freeing Denver University from debt.

Pointing Lister and Plow Shares and Shovels.

J. W. SMITH.

I use $\frac{1}{4}$ by 2 $\frac{1}{2}$ -inch steel. For shovels I cut the steel as near triangle as possible. I then hammer one side to as fine an edge as I can. The finer the better the job will be and the less grinding necessary. I then place the point on the face of the shovel holding same with the tongs. Then take a light weld on the other edge to hold the point. Now remove the tongs and reheat, using a compound composed of 16 ounces of pulverized borax, 2 ounces of carbonate of iron, 2 ounces of carbonate of soda and a handful of drill or lathe cuttings from Norway or Swedish iron. When I get the proper heat or when the compound runs freely, I take another pair of tongs made as shown in the engraving and press the point all over, commencing in the center so as to press out all compound and ashes that are likely to cause a flaw. When welded all over it is ready to sharpen. I lay it face down on the anvil and using a heavy

hammer I draw it out. I now have a shovel that is as good as any turned out at the factory. The advantage of pointing this way, is that all the wear is on the point and front of the shovel instead of the shovel proper, as is the case when pointed from the back. When the shovel is worn away, the point is not welded enough to hold longer and there is nothing to re-point, especially when the swallow-tail point is used. Those who have not tried these tongs and the above compound will be surprised to see how easy it is



A PAIR OF SPECIAL TONGS.

to do a good job. By using the tongs you can do the welding right in the fire. There is no loss of heat and the fine edge can be welded easily.

A Queer Shop in Texas.

W. P. WOOTEN.

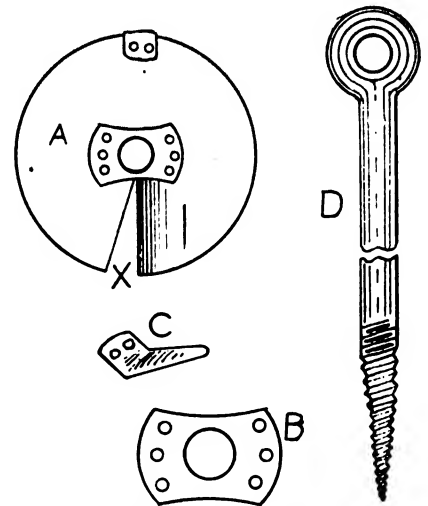
In speaking of queer shops, I will state to the readers of your valuable paper what came under my observation in the way of a blacksmith shop. In the month of June, 1904, I was in Bryan, Texas, one of the most prosperous and thriving little cities of five thousand population in the Lone Star State. While in this city, a gentleman kinsman of mine, who was a sewing machine agent, wanted me to put on a set of short axle stubs for him and shoe both his horses, but as we could not find a vacant fire in the city we went to a hardware store, bought 50 pounds of coal and the axle stubs and boxes, as he told me he knew of a shop six miles in the country which he could use. So we rode out and arrived there at 10 a. m. I found it belonged to a Bohemian. It was a log house covered with boards and was so small a man would have to go out of doors to turn around. The building had a door, which, when the owner worked on the tire of a hind wheel, had to be cut larger. His equipment consisted of a 32-inch bellows, a dry-goods box for a forge, an anvil cast with a steel face and weighing 75 pounds, one drill press, three pairs of crude blacksmith tongs and one six-pound sledge. A lot of old scrap iron reposed in one corner of the shop. A hen roost was in another corner. On the ground there were hen nests. His slag or water tub would have taken first premium at the St. Louis Fair. It was an oak log hollowed out and looked more like a pig trough than anything else. In that part of the country nearly every farmer has

a little blacksmith shop. I dined with the owner and we had a good old country dinner and some home-made wine. I finished my work, sharpened seven sweeps for him and said good-bye.

How to Make a Post Auger.

CHARLES NABLO.

This is particularly useful in boring holes in stiff clay soil, as it makes a clean hole and can be used without water. The auger blade can be made from the broken blade of a disk harrow or from a circular saw blade or any steel disc that has the required width and is not too thick. First center punch the plate, then mark the size required with a compass and cut in circular shape. Next punch or drill a $\frac{3}{4}$ -inch hole in the center of the disk. Then split from center to outer edge and cut out a small strip as at X so as to leave a better opening. Now sharpen both sides of split and turn one side down and the other slightly upward. Then forge a piece like B to rivet on the blade as shown at A. This piece should have a center hole which will admit of tapping with $\frac{3}{4}$ -inch tap and in which the stem D is screwed. Next take a piece of spring steel and forge a lip C, which is to be riveted on



MAKING A POST AUGER.

the blade on the opposite side of the split part, see A. This lip is intended to cut the soil on the outside, while at the split the cutting is directly down into the soil. The whole blade should be concaved on the outside edges—turned upwards. The stem should be made of $\frac{3}{4}$ -inch round iron, 4 feet in length, with an eye for a cross handle. The point should extend 6 inches below the blade and be twisted like a twist drill. A thread is then cut on the stem and screwed into the plate B. The auger can be made to bore fast or slow according to the downward bend given the cutting lip of the disk.

An Evening Ride.

OWEN INNSLY.

We ride and ride. High on the hills
The fir-trees stretch into the sky;
The birches, which the deep calm stills,
Quiver again as we speed by.

Beside the road a shallow stream
Goes leaping o'er its rocky bed:
Here lie the corn-fields with a gleam
Of daisies white and poppies red.

A faint star trembles in the west;
A fire-fly sparkles, fluttering bright
Against the mountain's sombre breast;
And yonder shines a village light.

Oh! could I creep into thine arms
Beloved! and upon thy face
Read the arrest of dire alarms
That press me close; from thy embrace.

View the sweet earth as on we ride.
Alas! how vain our longings are.
Already night is spreading wide
Her sable wing, and thou art far.



The man who succeeds grasps every opportunity.

Tomorrow is, was and always will be too late. Do it today.

Character is spoiled in many ways. Some men spoil theirs by killing time.

Happiness is looking at the brighter side of life and letting in all the sunshine you possibly can.

You should have plenty to do in the harvesting machinery line these days—if your competitor isn't getting it.

The recent adoption of a wheel standard is a step in the right direction, as all progressive smiths will admit.

Lock-repairing and key-making are the latest in the side-line field. What do you do? Have we heard about it?

Rivet your attention to the holding of old customers and then pay as much attention to soliciting new ones as you do to retaining the old.

It's well worth considering. Get right down to figures and consider the time, money and labor you would save if you had an engine.

You're losing time if you have not started that blacksmith association yet. Start the ball rolling. Send to Buffalo for complete plans today.

Form the habit—of placing a pink buffalo on every letter you write—of asking for more when you are out of them—of using them freely.

The apprentice—give him a chance. Don't be indifferent to him. Show an interest in his work, encourage, instruct, and train him.

How often do you touch up those slow paying customers? Statements on the first of the month followed by special letters will help you get your money.

It's an old saying that if a job's worth doing, it's worth doing well. To be known

as a first class workman is the best kind of advertising for the smith.

Ever try seasonable advertising suggestions? People don't want the same things all the year round. Think what they need now and give it to them.

Inattention to Business.—How many failures are the result of it? How many men are now courting failure? Every duty should have our undivided attention.

Country smiths are making good profits repairing automobiles. Break-downs often occur in out-of-the-way places, where a man will pay liberally for assistance.

Once a month for one year for one dollar. Better send the dollar now. If you received this copy free you may not get another and may forget. Subscribe today.

Taking the bull by the horns is all right, but who seizes the tail goes as fast and almost as far. The particular hold don't count as much as the determination to hang on.

The down-to-the-minute smith never thinks there is only one way to do a job. He knows the wrong way and why it is wrong. He also knows the right way and why correct.

Be enthusiastic over your work. Don't allow anything to dampen your spirit. No day is too slack or too busy, too hot or too cold to quench the ardor of the hustling, bustling, wide-awake smith.

Think, live and work truthfully. Be the same person always—always cheerful, kind, gentle and good. The Jekyll-Hyde has no berth in our modern year. Be frank not only to yourself but to your fellows.

The good business man is always busy. If work in the shop is slack the wise smith is spending his spare time on a profitable side line and every smith can choose a paying one especially adapted to his locality.

Because a job has been done a certain way for ten years, don't think it the correct way. It may have been first done by a "botch." THE AMERICAN BLACKSMITH shows the progressive craftsman the way.

A new volume will soon start; better keep your promise by sending in that little item today. Don't allow a single volume of THE AMERICAN BLACKSMITH to go on file without containing at least one interesting item from your pen.

Just a reminder—so many of our friends have taken advantage of our long-time rates that we are compelled to comment upon it and again remind you of the saving made possible by taking advantage of the rates on page 201.

In the drama of progress the prominent role played by the smith is never more apparent than at an exposition. At Portland, for instance, one cannot but marvel at the wonders made possible only with the humble smith's help.

This summer being rather cooler than last, few horses have been seen wearing hats. The Society for the Prevention of Cruelty to Animals is the distributing agent and for several seasons past has saved many a poor animal from the burning rays of the scorching sun.

Some say advertising doesn't pay. Others that they need pay too much for it. But, of two smiths, one an advertiser, the other not an advertiser, who pays for the advertising when the first man has all he can do, while the second man's business falls off steadily?

"Energy, sincerity, devotion, moral courage and unselfish purpose are the great essential qualities of character. But to these must be added that rarest of all human endowments known as *common sense*—the ability to think straight, the power to see both sides of a question."

"You might liken the business house of today to an electric light globe" said Thornton in speaking of advertising. "When the live wire of advertising is connected with it, the house is brisk with business and the globe is bristling with energy. But cut the wire—the current of patronage ceases to flow, and the globe is dead."

Washington once said to an army officer who continually blamed his tardiness onto an ancient timepiece: "Either you will get a new watch or I will get a new officer." Our first president knew the need of promptness and since his time its value has continually increased. Time waits for no man and in our modern times we may say with much fact that promptness is one of the most valuable qualities in a business career.

The following little item of present interest appeared in the Scientific American of September 2, 1868:

"In cutting some timber in Omaha, a few days since, a bullet was found imbedded in the trunk of a rock elm. The grains which had overgrown it show that it must have been deposited there sixty-two years ago, a time when the country had not yet been visited by any white men, except the explorers Lewis and Clark."

Passing Tom's shop one day last week, we saw an old, dilapidated rig outside bearing the time-worn legend "For Sail Cheep." It occurred to us that this was the old, rickety affair in which Tom appeared some-time ago, so we inquired for the horse. "Oh," said Thomas, "the horse died. No, I don't know what was the matter with him, but he never was much good since the time the roof over his stall fell in. You know we had quite a rain that night and I guess the horse got a little wet. But the old nag's gone now and I'm going to sell the rig." But we doubt the latter very much.

A German firm has patented a system for consuming smoke and preventing the wasting of coal which, it is claimed, is proving very successful. The system has been tested in Munich, where it was found that 72 per cent. of the combustible value of soft coal from the Saar district can be utilized when this smoke consumer is used. The conditions were unusually favorable at this station, but it is confidently claimed that almost anywhere the saving of coal will amount to from 12 to 25 per cent. The director of a rope and cable factory at Frankfort, Germany, where the system has been in use for some time, reports a minimal development of smoke only when fires are started or replenished; at other times no smoke is visible and the saving of coal amounts to more than 20 per cent. The owners of the patent allow to interested factories a four weeks' trial, guaranteeing a saving of at least 10 per cent. in coal. At the end of the four weeks a contract may be made for a period of five years, the annual charge for the use of the smoke consumer and for keeping it in order \$125 to \$175, according to construction and size.

American Association of Blacksmiths and Horseshoers.

Sitting in the shop, complaining of the present conditions in the craft, will accomplish nothing in the way of organizing your fellow craftsmen with a view of raising the prices of smith work. Action and immediate action on the part of the smith is essential. The present season is most propitious to start an association to improve the present state of affairs. Why not act upon this suggestion instead of waiting for the other fellow to make the start? You lead, and others will quickly follow and in less time than you had anticipated, you will have formed a strong and beneficial blacksmith association. The plans, which we offer to give our friends upon request, have been followed with much success all over the country. Your fellow craftsmen will be glad to respond to your call, for there are but few smiths who believe that they are getting just compensation for their labors, and what man, with the welfare of the good old craft at heart, would not be willing to support a movement of this kind?

It seems that the main trouble in the craft is that the smith lacks the ability to start a movement of this kind and each man waits for his neighbor to start the ball rolling. The many strong associations which blacksmiths have formed all over the country by following our plans should spur you on to action. All it requires is a little effort on the part of a few progressive smiths and others will pledge themselves to the cause willingly. A large majority of the blacksmiths in your vicinity realize that an association of this kind would help them in every way and while they are willing to lend every effort to that end still they need some one man to lead them. Why not take this responsibility upon yourself? Address P. O. Box 974 today. Tell us that you have decided to take up this matter and by return mail we will send you plans and full details for the formation of a blacksmiths' association.

Some Locomotive Forgings.

W. B. REID.

The accompanying illustration, Fig. 1, represents a common form of locomotive truck frame or cradle, a forging, it will be seen, requiring considerable ability and good workmanship in its construction.

The first requirement is a stiff sheet-iron template of the proper shape and size for the sides of the frame. The ends of the template should be cut out,

as shown by XX, at B. The sides of the frame are of 6-inch by 1½-inch or 1¼-inch bar or forged iron, preferably the latter. They are bent to the shape and proportion to the template, but with the stock at dotted lines (B) retained to form the scarf as shown at C, 1 and 2.

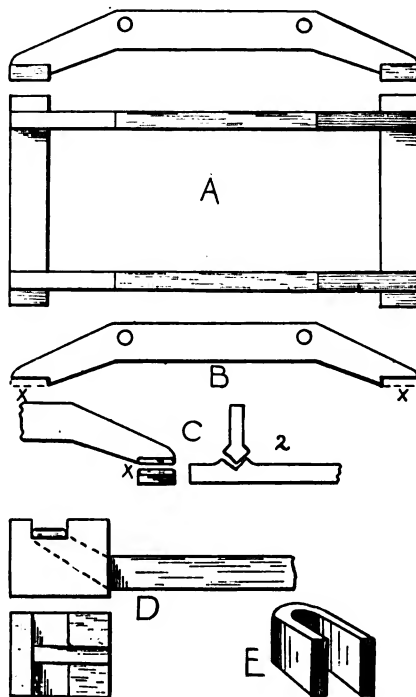


Fig. 1.—SHOWING VARIOUS STEPS IN THE FORGING OF A LOCOMOTIVE TRUCK FRAME.

This scarf is formed by upsetting with a fuller, or "bob" tool, and should be made as substantial as possible. The frame being made in halves requires the forging of four end pieces as at C 2, of 4½ by 2 by 24 inch stock, and scarfed as shown. By working accurately to the template all the corners can be scarfed before beginning to weld the parts together as at C 1.

Where quantities of these frames are made a cast iron block or die as suggested at D could be very economically used in welding the parts under the steam hammer. This die, it will be observed, is grooved to receive the side

bolster, as shown at E, would answer. This is made of 7 by 2-inch iron, bent as shown, with just sufficient space to insert the side of the frame. The scarf spreads over the top of the tool, the edges of which are nicely rounded so as to form a fillet on the welded parts. The side of the frame being inserted in this bolster, the end piece is laid diagonally across, as in the first instance, and driven together by a few light blows of the hammer. Or as might prove preferable in this case, the welding could be done directly by hand; the parts laid together upon a suitable face plate in the relative position shown at C 2, the side of the frame resting upon a block while the parts are driven together with a flatter and the scarfs welded in the usual way with two fullers, or round edged set hammers, simultaneously applied. A second heat, with probably the insertion of a "dutchman" at the heel X C, should be sufficient to square up and finish the piece.

The four corners can be very expeditiously and accurately welded in this way. The heating, in welding, must, of course, be just right with no careless wasting of the stock. Whether welded in the tool under the hammer as first described or as in the latter case, without its use, it is very important that the parts should be welded squared up and finished with as few heats as possible. By preliminary care in forming the sides accurately to the template and forging the end parts C 2, with the proper amount of stock to secure the right height of frame, the parts can be quickly and accurately adjusted when put together. The frequent reheating, twisting, and torturing of a complicated forging of this kind, by the clumsy and inexpert workman, does not tend to improve its quality.

The four corners having thus been successfully welded, the two halves of the frame are now ready to be put

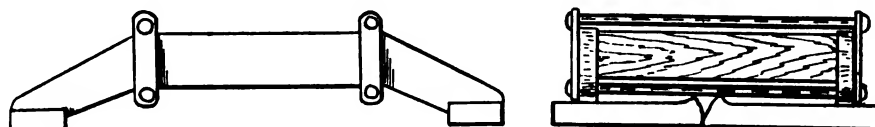


Fig. 2.—SHOWING SIDE AND END VIEWS OF PARTS OF FRAMES READY TO WELD.

of the frame and slotted across diagonally to receive the end piece C 2. Welded in a tool of this kind, under the steam hammer, a substantial job is secured. In the average railroad shop, where a forging of this kind is not a very frequent job and where the die shown above would not be available, a simple

together. The two views shown of the frame in Fig. 2, illustrate fully how this is done. Two perfectly square blocks of wood, of proper width, are placed between the sides of the frame, and the whole bound rigidly and accurately together by four bolts and plates as shown. The frame is scarfed for a

weld, which, in this case, will prove the most convenient. A heavy lever or porter-bar is secured to each end of frame, alternately, to facilitate handling with the crane, while welding. The necessity of having the two parts of the frame perfectly square, level and parallel with each other before attempting to weld them together is shown at a glance in Fig. 2. If otherwise than absolutely true, the smith will find himself involved in serious complications. By working accurately in detail, from the start, and by the frequent use of the square and face plate, the job will be simplified and completed to the satisfaction of the intelligent workman and the most exacting foreman.

A Talk on Coil Springs.

D. O. SHAW.

A coil spring that is wound in a lathe or a flat spring bent when cold may be tempered in an open fire and it will not get out of shape enough to spoil it for ordinary purposes. If, however, you want to retain its shape, heat it to a red in a gas pipe and then allow it to cool. If heated evenly, strains will be removed. After it gets cold reheat and harden.

Here is one plan for coiling a heavy spring; or even a small sized pipe may be coiled in this way. For instance, we want to make a spring that is 12 inches long and 2½ inches in diameter, out of ½-inch wire or rod. Take your ½-inch rod, heat the end and make the first bend. Then place it flat over the horn of your anvil and bend half way round to fit a 1½-inch shaft. The shaft should have a flat pin driven into it about where the work is placed in the fire. The first bend locks around the pin on top of the shaft but the second bend forms around the shaft and is brought underneath into the fire. The shaft should be fastened just back of your fire with a chain or something to hold it in place so that one man can pull on the rod while the other turns the shaft. Do not roll it up faster than you heat it. To temper a spring of this size, if the steel will bear water, put it in a bath which has first been warmed to 70°. After it is hardened, dip the spring in oil and flash it off over your fire as many times as you think necessary. It will require more drawing than if it had been hardened in oil.

The writer has tempered regulator springs of this size in the above manner. An oil tank was used that was 10 inches wide and 24 inches deep. The spring was heated and plunged into this. It was left in the bath for five minutes, then taken out and the oil flashed off

once. These springs would not stand water, but tempered in this way they have stood up well and have been working over a year. The smith should not stand over the oil bath when he hardens the spring, for the oil will catch fire and stream up six or eight feet high. I do not consider this rule which I have just given, as one to be followed unless the same sized wire and bath are used. If you have a larger or a smaller bath or wire, you will get different results. If one should use a larger quantity of oil, it

made flat drill used, it would have saved time and expense.

The Making of Socket Wrenches.

C. H. RICHARDSON.

In two or three of the past editions of THE AMERICAN BLACKSMITH I have noticed with interest the different plans used when forging socket wrenches. It is my object in this issue to speak of two styles in common use, and also explain the plan that has proven the most successful through my experience.

The accompanying illustration, Fig. 1, shows the style of wrench that is met with in every-day practice, and should be well understood, so that a serviceable tool can be produced at a modest cost. The two eyes in the handle of wrench are at right angles to each other, as shown. Bars are placed in these to work the wrench. The easiest way to forge this tool is first to make a collar the depth of the socket, being sure to leave the collar large enough so the pin will enter while the collar is round. Next make the handle or shank as shown at A, drawing the distance between 1 and 2 on A. Now flatten and punch the eye marked D. Then at right angles to this, punch the other eye marked E. Now draw the hand-rest end shown at F and finish the end G to the size of the collar. The handle is now ready for the socket. With a welding heat on the collar end of the handle, drive it into the socket, then reheat for welding. When ready, place in a pair of spring swages, with a pin made of tool steel held straight in the socket and drive the swages down, forming the wrench to its exact outside diameter. While the wrench is still hot, drive out the pin, reheat and finish off. The easiest way to loosen a pin in any kind of a socket is to rest the socket against the edge of the anvil, leaving the pin lay on the face of the anvil and with a cold chisel held slanting toward the smith, drive it out. This plan prevents the tool from working the socket any larger than it should be and also prevents the forging which would result from its flying out of the tongs every time that it was struck with the sledge.

An open sleeve wrench is shown in Fig. 2. This was designed especially for a three-inch nut, which was in a deep recess of a casting. There being a jam nut on the bolt, it was necessary to have this deep socket so the wrench could reach the bottom nut. The upper part of the socket was left open. Apparently the only reason for this was to lighten the tool. It offered quite an interesting proposition as to the best

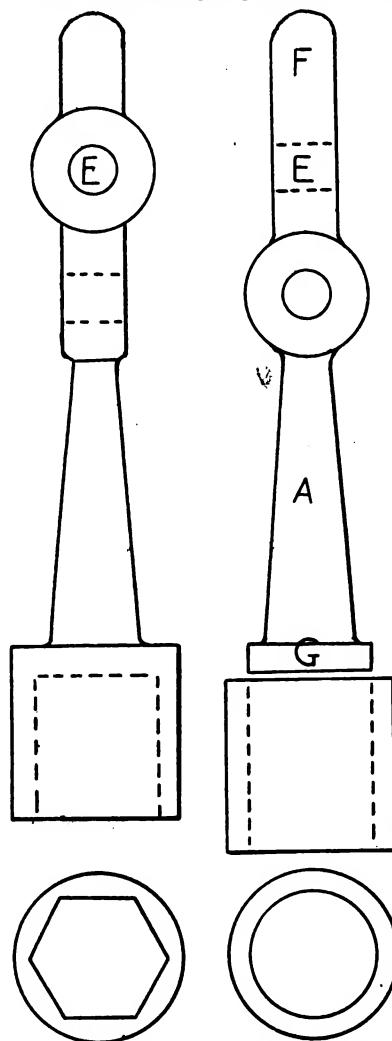


Fig. 1.—SHOWING THE USUAL STYLE OF SOCKET WRENCH.

would make the spring harder and would require more drawing. If a smaller quantity of oil was used it might not harden at all. The smith should use his own judgment.

The writer remembers, when an apprentice in a job shop, of drilling a wagon spring. The spring was welded and cooled in the open air. It was hard and the twist drill would catch, break and roll up. After a great deal of trouble, a kind of three-cornered hole was made through the spring. If, after welding, it had been heated and put in hot ashes until cold and then a home-

way of forging it without welding it at A and B, Fig. 2. The plan followed was as shown in Fig. 2. With a piece of stock forged to the dimensions shown, I fullered and drew the distance between

being the same size that the wrench is to be on the outside.

Now reheat the work, place the tool as shown at D and drive the whole thing through the collar. Then drive out the

is the use of steam and gas for power, the lathe, the power hammer, the cutting-off and the threading machines.

Good judgment and discretion should be used in the selection of machines adapted to the general run of shop work. When purchased they should be properly located in a good light; the hammers convenient to the fires; the engine to be near the boiler so as to avoid the loss of steam by condensation; the engine near the machines it is to operate, so as to avoid unnecessary length of shafting, and so on through the whole shop.

But most of these matters will readily suggest themselves to the thinking and progressive man and the one subject in connection with the setting up of new machines, engines, boilers, and similar equipment will be proper foundations. With heavy machines and with hammers, under which there is much shock, faulty foundations are the most frequent causes of failure. The subject of foundations is therefore one of such importance as to merit careful consideration.

The first point is, we must have a foundation that will remain as nearly as possible in the condition as when first built, no matter to what strains or shocks it may be subjected. This is very important. And if we are to have firm foundations we must, in turn, have a firm and solid bed to lay it upon. If the ground is not so we must take the proper means to make it so. There is frequently much difference between the ground at the surface and that below it and we find it in various qualities from the solid nature of rock to an almost fluid consistency. These varying conditions require special consideration in preparing for a foundation. For this reason we must either excavate down to solid ground, usually called "hard pan," or produce by artificial

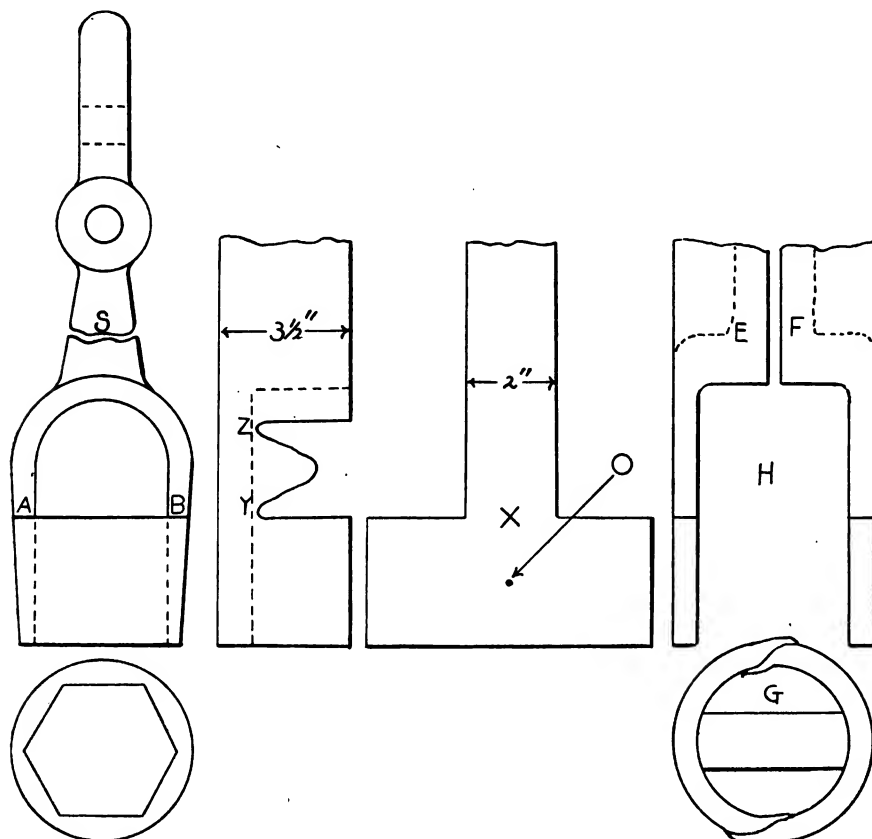


Fig. 2.—SHOWING THE METHOD OF FORGING THE SPECIAL WRENCH.

Y and Z and then flattened as shown at X. With O as a center, lay off half of the circumference of the band or collars as shown by G and scarf these ends for welding. Having forged two of these pieces, dress the ends marked E F, leaving $\frac{1}{4}$ inch for welding on each one. I welded them together as H would show if the dotted lines were solid and then bent and shaped the pieces as at G and welded them on the horn of the anvil. The entire end was then reheated, a steel pin placed in socket and finished off.

The following method of forging a wrench I have used considerable of late and it has proven a great help to me. The first step is to draw the shank and cut it off as shown at A, Fig. 3. The piece has the appearance of a bolt before the head is finished. Now flatten the head part as shown at B to $\frac{1}{4}$ inch thick with a 4-inch diameter. Then take the stamping die, E, which is a round collar with a very deep countersink, and place the shank of the wrench in it with a pin, P, on top as shown at C. Now drive the whole thing into the countersunk tool. At D, F represents a plain collar, the diameter

pin and straighten the work. A perfectly smooth piece of work can be made in this way with three heats.

This is probably the easier method for use in the average smith shop.

Machine Foundations.

OSCAR E. FERRIGO, M. E.

It is to be said greatly to their credit that the blacksmiths of today often do work that was performed by the machinists of twenty years ago, and in

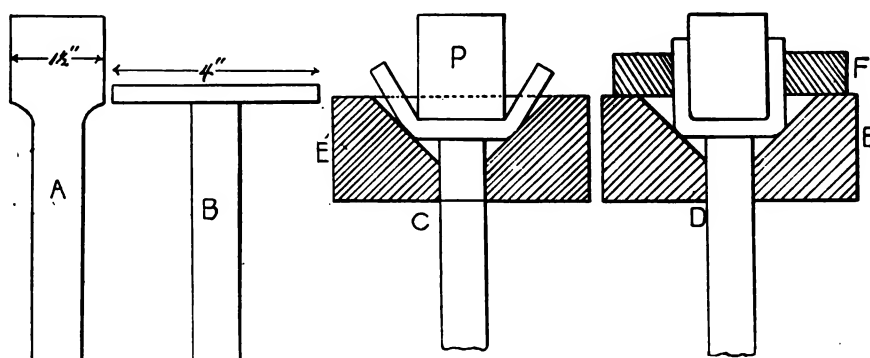


Fig. 3.—SHOWING ANOTHER METHOD OF FORGING SOCKET WRENCHES

working up to this higher grade he has adopted and made good use of many of the facilities formerly found only in machine shops. Notably among these

means a substantial surface upon which to build our foundations.

It is impossible by examining the surface of the ground to know how

deep we must excavate in order to reach solid ground. We may ascertain something of this by "sounding," that is, by making small excavations at various points.

It may be found that at some points we need go down but two or three feet, while at other points two or three times that depth, and at still others it may be

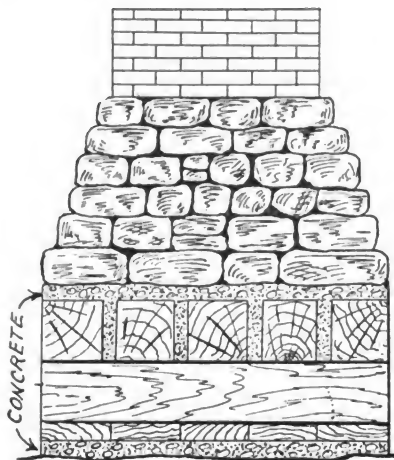


Fig. 1.—SHOWING PLAN OF APPROVED MACHINE FOUNDATION.

necessary to drive piles. This should be avoided if possible, owing to the expense of getting a pile driver to the work. Of course, no ground can be found or prepared so absolutely solid as not to yield somewhat when a great weight is put upon it, and therefore we must not expect to prevent a certain amount of settling; but we should use all possible care to have this settling as nearly equal as possible over the whole area of the foundation. The nature of the ground having been ascertained, the kind of foundation may be determined. When the ground has been found to be of a soft and yielding nature we must resort to piles, which should be driven closely together and cut off level at the top, and low enough to always remain wet, and so exclude the air and prevent decay. Timbers may then be laid across the tops of the piles, covered with a course of cement mortar and the stone or brick work laid. Or large stones may be laid directly upon the ends of the piles, first spreading a coat of mortar upon them.

It may sometimes happen that reasonably solid earth will be reached within three or four feet, while it would require digging much deeper than this to reach "hard pan." In such cases it is sometimes advisable to first put down a four or six inch course of concrete, then a course of three inch planks, then one or more courses of timber, covered with a thick course of concrete, upon which the stone work may be

built. This should be done if there is any doubt about the timbers being always wet enough to exclude the air and so prevent decay. If the ground is not wet enough for this purpose one course of planks and one of timber may be used. This is shown in Fig. 1.

In all foundation work the importance of using strong mortar demands that careful consideration be paid to the proportions of its ingredients which will make the best compound of its kind. This is all the more important when it is used where the surrounding earth is quite wet. To produce the best results we should use two parts of Portland cement, one part of slaked lime, and about three parts of sharp, clean sand. The quantity of sand must be varied according to its fineness, sharpness and its freedom from dirt. A larger quantity of fine sand will be needed than of that which is coarse. Foundations are generally laid in mortar having a greater or lesser proportion of cement. They should also be stronger for the lower or underground courses than for the upper ones so as to better resist the action of water. Frequently a great proportion of a foundation is laid in mortar composed of cement and sand only, omitting the lime altogether.

Foundations for buildings must be treated in a somewhat different manner than those for supporting machines, as the former have for their object that of sustaining the weight of not only the contents of the structure but that of the building itself. In the case of the foundations for machinery we have not only the weight, but the vibration of revolving and reciprocating parts and the shocks of such machines as steam

engine and the vertical concussions of the steam hammer and the drop press.

Foundations for gas or steam engines are built somewhat like those for the building except that they are much broader at the base and are built up in a general form, as shown in Fig. 2, which shows an end and part of a side elevation. For all machine foundations a good quality of hard bricks should be used and the entire work should be laid in strong cement mortar with all joints completely filled as fast as the bricks are laid. The holding down bolts should extend to the bottom of the foundation and have plate washers from six inches square up, according to the size of the engine. These bolts are put in when the foundation is begun and their upper ends held in position by a template of boards with holes at the proper points to represent the bed of the engine. In a large foundation, blocks of dressed stone are worked into the top of the foundation, placed across it, as shown in Fig. 2, but for small steam engines and gas engines this will not be necessary. Ordinarily the foundation should not be over one inch larger all around the outside measurement of the bed. For high speed engines it is sometimes advisable to cover the top of the foundation with a cast iron plate, as shown in Fig. 3. This has flanges all around it projecting downward to protect the brickwork. In setting it the method is to block it up a half inch or less from the brickwork, level it up, close the spaces around the lower edges of the flanges with thick cement, and then pour through the hole in the center of the plate, cement mixed thin enough to run freely into the space

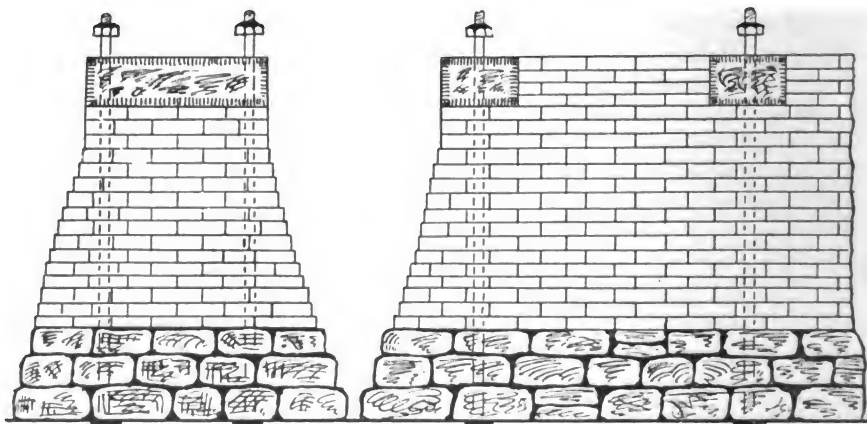


Fig. 2.—SHOWING SIDE AND END PLANS OF ENGINE FOUNDATION.

hammers, drop presses and the like. These conditions vary largely in different cases, but in the forge shop we will have mostly to deal with those resulting from the reciprocating motions of the

between the plate and the brickwork, and allow it to "set" hard and firm. When in proper condition the engine bed may be placed on the foundation, whether prepared in this way or not,

wedged up with steel wedges about a quarter of an inch and leveled up lengthwise and crosswise very carefully. With clay or putty form a rim about half an inch high all around the bed and a quarter of an inch from it. Pour into the space thus formed melted lead or brimstone, and let it cool. Screw down

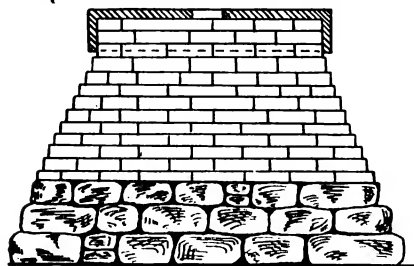


Fig. 3.—SHOWING PLAN OF ANOTHER ENGINE FOUNDATION.

the nuts on the holding-down bolts and again try the level to see that all is right. The engine should not be put on a new foundation until it has stood for a week or so to thoroughly dry and harden.

There is a considerable difference of opinion as to the best foundations for steam hammers, drop presses and the like. Some good men of ample experience prefer one solid granite block under the anvil of a steam hammer. Again, equally good and experienced men condemn this very solid and unyielding foundation for the anvil, and prefer a timber foundation, so as to get a certain degree of elasticity for the anvil. The writer has found upon investigation that a majority of forge men prefer the latter method, and it is herewith illustrated in Fig. 4.

There are two common types of these foundations. The first one, for small or medium size drop presses or ham-

mers shown in Fig. 4. Timbers ten to twelve inches square will be a convenient size, and hard pine is found by experience to be best. The excavation is first made to solid ground, then a foot or so of hard gravel is tightly rammed down in the bottom. The timbers are then cut to the proper length to reach the surface, but should not be less than five feet long. They are bolted together, lowered into place, and leveled up, after which good hard gravel is tightly rammed in around the timbers. In case the hammer is of such size as to have the anvil detached from the main frame, the latter is supported upon a stone foundation, or one part stone and part brick, and the foundation for the anvil composed of wood. This form of foundation is shown in cross section in Fig. 5, and side elevation in Fig. 6. The stone foundation for the hammer frame is built in two parts for the two legs of the frame, while the anvil foundation is built up between them. The stone and the wooden foundations should not be connected in any way. The stonework should be spread out sidewise at the base so as to give as much stability as possible, while the timber work is spread out lengthwise of the foundation for the same reason, and to resist, as far as possible, the force of the blows. With a hammer of a single leg, or base, the same ideas of getting as large an area at the base of the foundation should be carried out.

The proportionate dimensions of such a foundation are necessarily made to suit the size of the hammer, but it will be approximately as follows: Suppose the width between the upright parts, or

the necessary depth will be four feet. If solid ground is not found at this depth, the excavation may be filled up to the proper height with hard gravel,

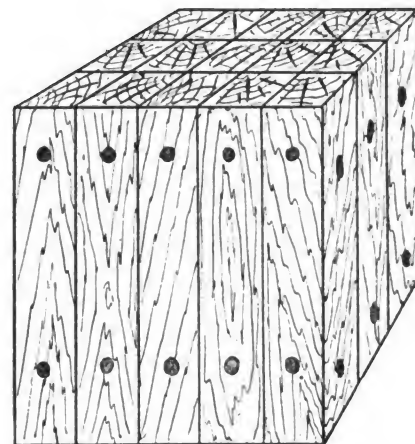


Fig. 4.—SHOWING FOUNDATION FOR SMALL DROP PRESS.

stone or concrete; or a layer of concrete may be placed at the bottom, then a course or two of stone laid in cement mortar, and finally hard gravel well rammed in. The timbers should be bolted together at the corner and the ends of the top timbers bolted together horizontally. The size of the timbers may be from six to twelve inches square, according to the size and weight of the hammer, but usually they are about ten inches. All timbers used in places where decay is feared on account of dampness should be coated with hot gas tar as a preservative.

In setting up the hammer frame on its foundation the same method should be used as in setting up the engine, except that brimstone will not do for bedding it down. Melted lead should be used in all cases and great care must be exer-

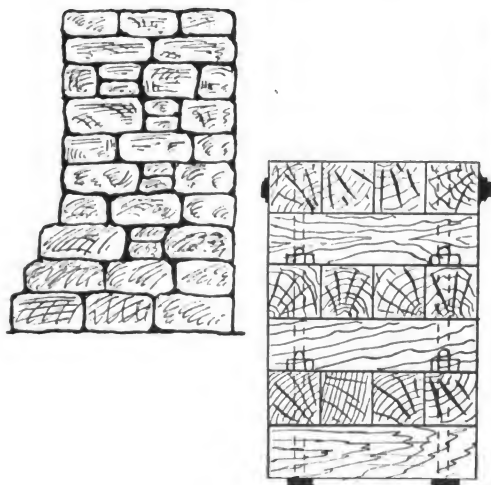


Fig. 5.—SHOWING CROSS SECTION OF FOUNDATION FOR LARGE POWER HAMMER.

mers, is built with timbers, set on end and bolted together in both directions in sufficient numbers to form a foundation of the required size, as

legs, of the frame to be six feet, the width of the timber work will be four feet, the length on top eight feet and at the bottom twelve feet, assuming that

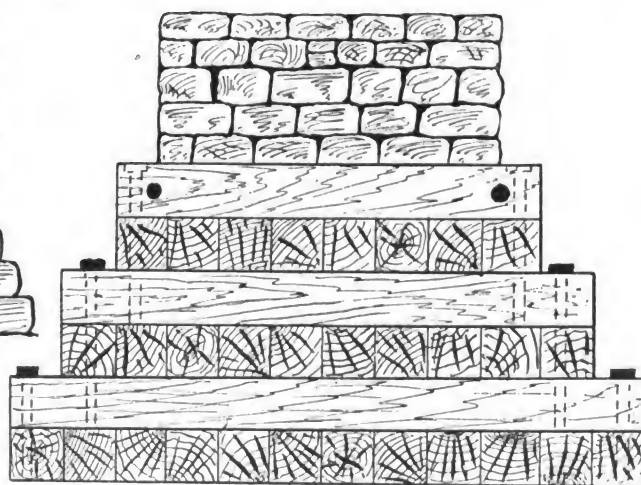
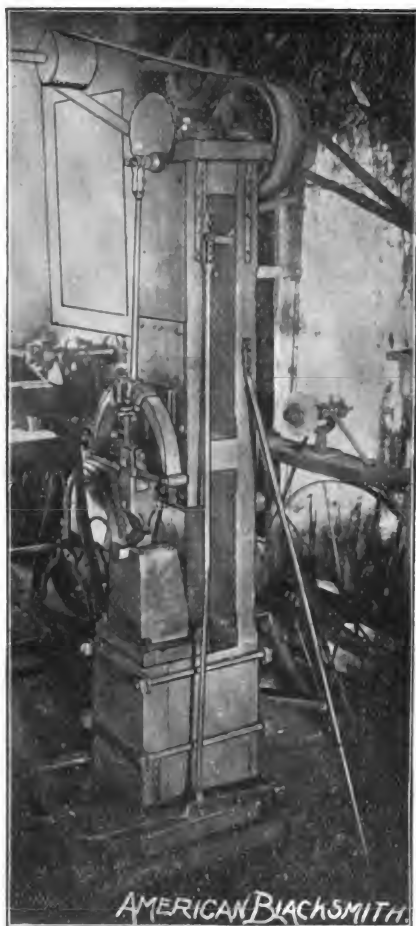


Fig. 6.—SHOWING SIDE ELEVATION OF Fig. 5.

cised in so leveling up the frame that the piston rod be exactly plumb when tested from the front or the side. The foundation for the boiler will be

comparatively simple, as the style of boiler usually preferred in the smith's shop is the upright type, which seems best adapted for this purpose. It occupies little space, is easy and economical to set up, and is convenient to manage. The foundation for this will be built in the same general way as for a machine, care being taken to get in sufficient foundation, usually two or three feet deep. Commence at the bottom with a course of large stones, and upon these build the brickwork, circular in form, over the whole area. The top course of bricks should have a row of headers around the outside and this circle should be three or four inches larger than the base casting, and carefully leveled up in all directions. A coat of cement should be spread over the whole of the top surface and smoothed out to furnish a good ash pit floor. If obliged to excavate lower than three feet the



A HOME-MADE POWER HAMMER.

space may be filled up to that depth with stone, concrete, or hard gravel well rammed down. Allow the foundation to stand for about a week after it is completed before the boiler is put upon it, and care should be exercised not to loosen any of the bricks in moving the boiler into its place.

The directions given in this article, and the engravings illustrating it, may seem unnecessarily elaborate, but the writer believes that a careful study of them will save a good deal of annoyance and expense to the man equipping even a small shop, and he will be less liable to encounter disappointments later on.

How We Made a Power Hammer.

JOHNSON BROS.

The accompanying engraving shows a trip hammer that we built during the past year. The frame is made of 3 by 10-inch oak and is 5½ feet high. The anvil I had cast. I made a pattern for it out of pine and sent it to the foundry. It weighs 103 pounds. The hammer is made of Black Diamond tool steel 2 by 3½ by 8 inches long. The spring has five leaves and is made of ½ by 1½-carriage spring steel. I took a bar 10 feet long to make it. The crank wheel is from a Champion binder. A clutch pulley is used on the hammer to connect it with the line shaft. We first used a belt tightener, but it did not give satisfaction as it would cut the belt. So we made up our minds that a clutch pulley would be just what we wanted. We got the price from one of the dealers and as he wanted \$23.50 we decided to make one. In a short time we turned out a clutch pulley that works as well as any, and it cost us only the time that we spent in making it. I could make one now in a half day. If any of the craft want further information or a description of it, write us and we will do our best to help you out. We can truly say that the hammer gives entire satisfaction. We can sharpen shovels at from one to two heats, according to their size, and plow shares from three to four heats and do it better than by hand. I would not like to go back to the old-fashioned way.

We have a 2½-horse power Weber engine and it runs the hammer, emery stand and blower, all at one time with ease. We know that power pays. We run by power; one 10-inch planer and grooving saw combined; a 16-inch rip saw; one tenon boring machine, one Champion disc sharpener, a Star screw cutting lathe, one No. 14 Western Chief Power drill, a washing machine and a lawn mower grinder. All these with one engine. I would go out of business if I had to go back to hand power. Life is too short and sweet to waste your strength doing everything by hand. Our shop is 22 by 48 feet and is about half large enough for our work.

We do both iron and woodwork in the same room and find ourselves crowded

at times. It would undoubtedly be better to have separate rooms for each department.

Another Knee Knocker—A Special Case.

E. W. FERRIN.

The horse that forms the subject of this article belongs to the Chief of the City Fire Department of Little Rock. This is a very remarkable case inasmuch



SHOWING FRONT LEGS OF THE FIRE CHIEF'S HORSE.

as several horseshoers have tried to remedy the trouble without success. He had been wearing a boot from the ankle to the knee, but notwithstanding the protection afforded by this boot the concussion was so severe as to cause the left leg to be swollen from the fetlock to the knee, the circumference of the cannon bone—shin—being as large as the knee.

This horse is a fine looking animal, being the fastest horse in the department. A side view of him reveals a perfect conformation, but a front view of the fore legs reveals a serious defect, to the student of conformation. The accurate observer will detect the right knee leaning in while the foot of the same leg is "out of plumb." Another defect is that the left leg is twisted outward from the arm down to the foot, in other words, toe-wide. This horse was striking the ankle of the right leg and the knee and cannon-bone of the left. The conformation of the two front legs being different, the set of two feet will also be different, in other words, each foot, to be level—balanced—must conform to its limb. This case is one of those in which the outside of one hoof is naturally high, while the outside of its

fellow is low. Following the mode of treatment as indicated by the conformation of the limbs, I left the inside of the felt foot high and rolled the outside quarter. On this foot I used an

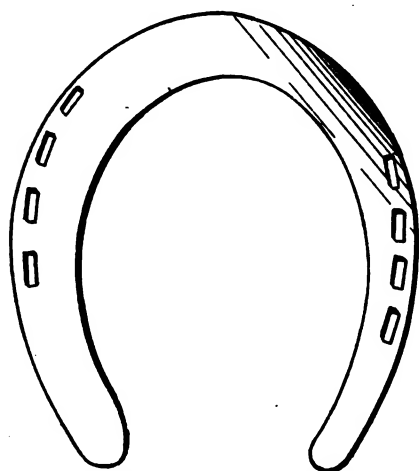


Fig. 1.—SHOWING LEFT FRONT SHOE WITH INSIDE WEIGHT AND ROLLED OUTSIDE TOE.

inside weight rolled at the outside quarter. See Fig. 2. This prevented the animal from hitting the opposite ankle at once, but the shin and knee-knocking were difficult. I tried three different kinds of shoe before I obtained the desired effect. I found it necessary to extend the outside toe wide enough to compel the horse to break over at the inside weight-toe. But any additional weight made him hit the knee higher up, so I made the base of the shoe very light and welded the extension on which shoe he is wearing in the engraving. This shoe made a marked difference, the horse only hitting himself occasionally, but the continued application of this shoe has cured the trouble. You will observe there is still some swelling on the inside of the

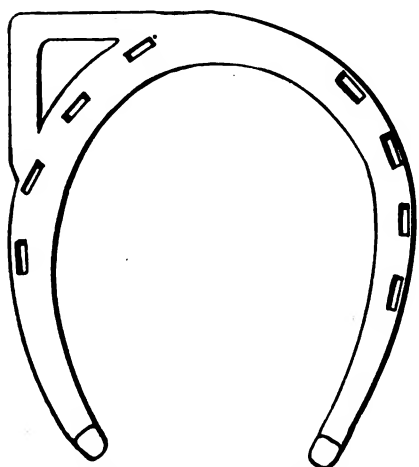


Fig. 2.—SHOWING THE SHAPE OF SHOE FOR RIGHT FRONT FOOT.

left front leg, but this is slowly disappearing and the horse goes perfectly clear without the boots. This animal

had been interfering for a year, sometimes so badly as to render him unfit for work altogether.

To look at the picture the casual observer would wonder that a horse with such width of chest and legs so far apart, would interfere. This case affords a useful lesson in the need of scientific instruction in the art of horseshoeing.

The Practical Side of Horseshoeing.

FRANZ WENKE.

Too few horseshoers pay proper attention to their work. They should in all cases pay close attention to every little thing they do on a horse's foot, from the opening of the clinch, to breaking the corners of the hoof with the rasp, after having clinched the shoe. I believe the proper way is to open the clinch with the buffer, lift the shoe, knock it back and withdraw the nails one by one. This way you will not wrench the horse's joints. Now turn the horse's foot down level (I am talking about normal feet) and do not do any fancy cutting on the sole or frog. Leave them alone, nature will attend to them. Now take the measure for your shoe and fit the shoe to the foot. Next file the shoe and break the outside sharp corner on the hoof surface of the same. Drive the two toe nails first always. After driving all the nails, drive home lightly without clinch block, after which draw the shoe down solid with light blows using the clinch block under the clinch. Clinch and finish up by breaking the outside corner of the hoof with the rasp. Do not file or rasp the outside shoeing surface of the hoof. By doing all these things carefully and with judgment, the shoer will always have a good job, the horse nice feet, and in time the customer will see his own benefit and will gladly pay the proper price.

I worked in a shop at one time where they claimed and advertised "Scientific Horseshoeing." The shoes were fitted by sight before the old shoes were off the horses' feet. Consequently resulting in too much rasping of the outside shoeing surface, the shoes would not stay on. As floorman, I had to take the blame, was discharged and am glad of it.

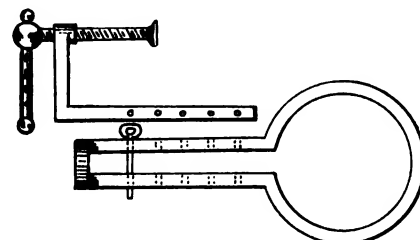
A Clamp For Rimming Wheels.

A. M. SPEER.

I see very many tools described in the paper and will endeavor to tell of one I made some time ago. It is a clamp to help out on spring rims. I took a big screw clamp I had and removed the stop. I then took a piece of iron 1 by $\frac{1}{2}$ inch and bent it to go around the hub as shown in the engrav-

ing. I then drilled holes in it to slip a pin or bolt through. I also drilled holes in the clamp so as to allow for different sized wheels.

When ready for use place this ring over the hub, put the clamp between the two prongs and place the pin in the hole to make the right length. Now screw the clamp up against the rim. It must go up if the spokes are loose in the hub. Now loosen the clamp and



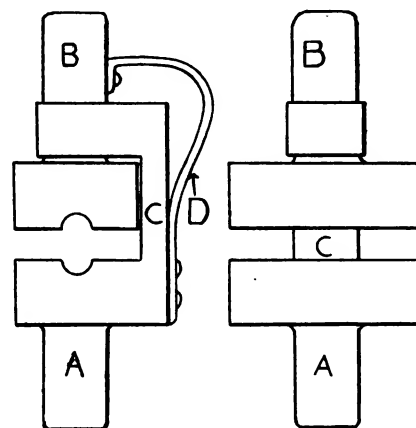
A CLAMP FOR RIMMING WHEELS.

slip the ring around the hub, and proceed as before until the entire rim and all spokes are tight. I have been working thirty-one years and this is one of the handiest things I have ever come across. I used a chain around the hub for a while, but it didn't pull straight. Of course with light rims you do not need a clamp of this kind.

A Tool for the Smith Without a Helper.

H. N. POPE.

The accompanying engraving shows a very handy tool for the smith without a helper, although I do not advocate a man working alone. The piece marked A is the part thrust into the hardy hole of the anvil. The part B is the top or the part which is struck with the hammer. The part C is simply a guide for the top part. The piece D is a spring and is arranged in such a manner as to



A HANDY TOOL FOR THE SMITH.

lift B each time it is struck with the hammer. This tool is simple and easy to make and will perform quite a range of work. It can also be made so as to punch thin band iron. Progressive craftsmen will find a suggestion of

many other tools in the jumper illustrated here. This is not new to some smiths, but many younger will make its acquaintance for the first time.

How to Make a Spring Head.

RICHARD O'HEARN.

I know but very few smiths who can put a head on the upper main leaf of an ordinary elliptic spring. I know a number of them who are not aware that the head is of iron and some who, knowing it, don't know how it got there. It sometimes proves convenient to know how such a job should be done. Here is the best way I know. Cut off steel length wanted, less $\frac{1}{2}$ inch for each end. (We will make only one end for illustration). Take 3 inches of $\frac{3}{4}$ -inch square Norway iron. Split through from one side as at A, and have the split the width of the steel to be used. Now fuller as at B, insert steel as at C and weld. Then trim as shown by the dotted lines at D. The ears can be bent in the vise without danger of injury from cold shut and should be bent as at E. Now dress up thread in the tool F, after fullering between the ears. Fullering will bring the ears parallel and after dressing them, the holes are drilled.

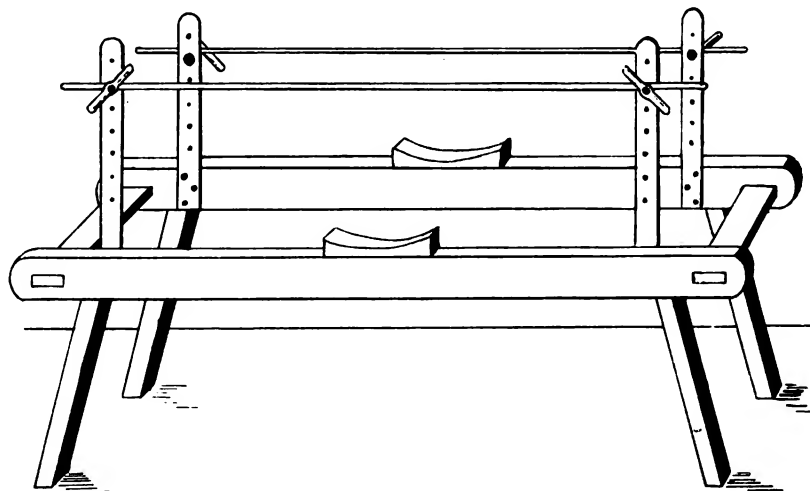
A Machine for Driving Spokes.

GEO. E. BRIERLY.

In the first place no guide is necessary when driving spokes. If the spoke is set right, that is, the mortise made correctly, the spoke will drive true. When I say no guide is necessary, I do not mean you should have no measurement to go by. I mean it is not the fashion for a good mechanic to have a rest to press the spoke against while driving it. The best machine I have ever seen for driving spokes is like the one shown in the engraving. This will explain it all. The machine is best made from oak. The

over others is that the hub can be mortised and the spokes driven and cut off the required length without taking the hub from the machine. It is also very

I shod the mule for about twelve months and at the end of that time, the toe was sound, would hold the front nails all right and the foot had the



A MACHINE FOR DRIVING SPOKES.

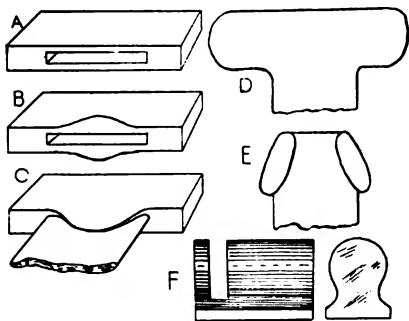
solid, because when driving the spoke, the blow strikes down toward the floor, instead of sideways as in other machines.

How the Mule With Seedy-Toe Was Cured.

M. L. CHUNN.

The mule was three years old. His hind feet were about $\frac{3}{4}$ of an inch too long in front and hollow at the toe up to within about $1\frac{1}{2}$ inches of the hair. The heel had grown forward to a great extent. It looked as though the mule would be walking on part of his leg after awhile if something were not done for it. One shoer said the mule had been foundered and it would get all right when its hoof had grown off. The mule when brought to me was shod with shoes about $1\frac{1}{2}$ inches longer than they would have been had the foot been in a natural shape and with calks about one inch high to make the foot look right. I examined the foot and decided that I could not make a foot look natural by shoeing it unnaturally. In order to get the heel back where it belonged I cut the heel down all it would stand and then cut all I could off the toe at the bottom. I said the toe was hollow, but it was not, it had a kind of pith in it. I made a shoe for the foot as I would had the foot been sound and when I put it on, I set it back just half way of the pithy part of the toe. I left out the front nails and dressed the toe down half way to the hair in order to give the foot a natural shape. In about five weeks I reset the shoes, again placed them back half way of the pithy part of the toe and rasped the toe off. This time I went higher in dressing than I did at first, in order to keep the hoof straight in front.

proper shape. Every time I reset the shoes I went higher in front with the rasp until I got up to the edge of the hair. When the mule was sold you could tell something had been wrong with its hind feet only by a sore on the hoof in front where it had not grown perfectly solid. I believe that in shoeing a mule with seedy toe, you could set the shoe back and take the front part of the hoof off all at one time, but in doing this the mule should not to be worked and then I don't know that it would be any better. In shoeing as I have described you must use some kind of hoof ointment to grow and toughen the hoof. I used the ointment that Prof. Rich gives in his book "Artistic Horseshoeing." In taking the toe off only as you reset the shoes, you make the hoof tough and there is no danger of the mule getting lame, which might be the case if you took off the entire toe at one time.



HOW TO MAKE A SPRING HEAD.

main pieces should be 4 by 5 inches by 10 feet long and the legs of $2\frac{1}{2}$ by 3 inches. The top pieces which hold the hub down should be 1 by 3 inches and about 4 feet long. They must be of good, tough stock. The advantage of this machine



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

If there is any one season when varnish needs more "coddling" than at another, it is summer and the new varnish user will do well to heed what the experts say to the very letter. Pitting, silking and sweating are among the "dog-day" misfortunes of the varnish room, but they can all be overcome by carefully conforming to the rules and regulations set down by the expert varnish user.

A good cement for closing leaks in iron

pipes can be made by mixing 5 lbs. coarsely powdered iron borings, 2 oz. powdered sal ammoniac, 1 oz. sulphur and enough water to moisten. This mixture must be used quickly for it hardens in a very short time. On this account it should be rammed tightly into the joint or leak. If the sulphur in the formula be omitted, then the cement will set more firmly, but will require a longer space of time.

The following is sent us by one of our New Mexico friends as a good way to preserve a horse's feet. Wash the feet clean with cold water at least twice a week. About every three weeks, after washing the feet and letting them dry, use the following ointment: Natural asphalt boiled with enough beef tallow to make it run like thick molasses. Then put to each quart of this mixture two ounces of oil of turpentine. Use the ointment on the outside of the foot and on the sole.

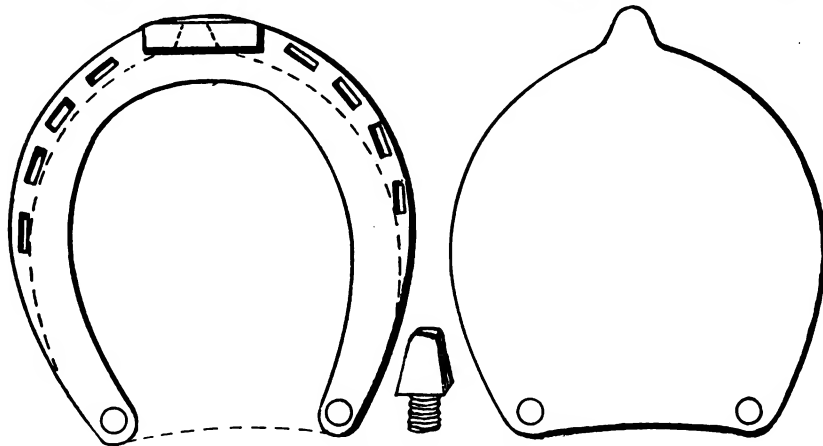


The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

To Make a Tack-hammer.—Can some brother smith tell me how to make a tack-hammer? One with a tack lifter at one end and a hammer head at the other. Kindly send diagrams. J. W. JOHNSON.

Hardening Track Chisels.—Kindly tell me how to harden track chisels properly. I am having trouble with them and will greatly appreciate the help any railroad brother may give me. PATRICK MAHER.

A Horseshoe With a Cover.—A horse sometimes has a disease of the hoof in which case it is necessary to keep the hollow of the foot absolutely clean and with this object in mind I suggest a shoe and cover made as



A HORSESHOE WITH A COVER.

shown in the engraving. Cleanliness, next to the treatment, is the principal consideration in curing a wound and not only will this cover keep the dirt out but it will permit for the packing of the hoof and secure it in proper place. Of course this shoe may be varied for use for different purposes and some alterations will probably

suggest themselves readily to the progressive smith. Should any brother have a better shoe in use I would be pleased to hear about it. M. KEPLINGER.

One of Many.—THE AMERICAN BLACKSMITH is the best paper for the blacksmith or wagon-maker. It advocates the Lien Law that I am so much in favor of, it advocates good tools, good work, good prices and everything that is good for the smith. I try to get every blacksmith I see to subscribe for it. I could not afford to do without it. WHIT CRANFORD.

A Tire Furnace vs. Cold Setting.—In reply to W. Smith in the June number concerning the building of a furnace for heating tires, will say this would be a very difficult job, as all tires are not the same height. The whole trouble can be overcome by putting in a House Cold Tire Setter which will do this work perfectly and in less than one-fourth the time it takes by the old method. J. W. JOHNSON.

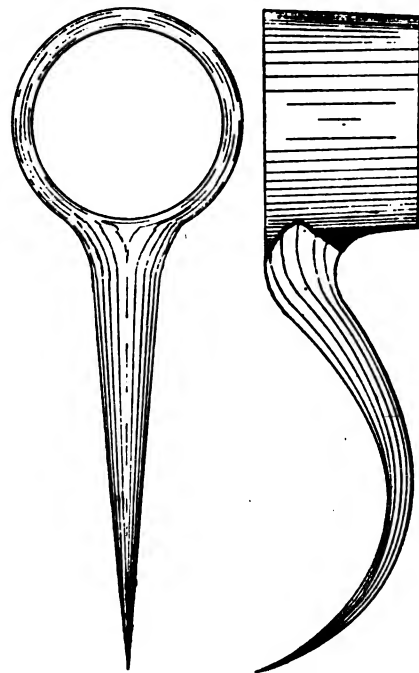
Welding Tires.—Bevel the ends for the lap and spring the tire so that the laps will lie tightly together. Now heat nearly white and place the top lap below and heat white. Now place laps as at first and heat slowly to a welding heat. You will then have a melted heat and not a burned one. A little white sand will make a steel tire work easier and nicer. When heating iron care should be exercised to remove the scales that form. I weld four-inch tires by this method and find it much better than heating to a welding heat the first time as in the other way. GEO. W. TINKEY.

Work During Slack Time.—I started in one winter when work was slack to build an iron fence around my cemetery lot. Since then I have made quite a number of these fences and also lawn and garden fences, using $\frac{3}{4}$ -inch round iron for pickets, 1 x 1 by $\frac{3}{4}$ -inch angle steel for rails and two-inch pipe for posts. I also make wooden tanks and cisterns and repair everything in agricultural machinery from traction engines to post augers. I have a steam engine and find it very reliable. I am located in the coal regions where screenings are very cheap. A. L. ERICSON.

How to Make a Cheap Wedge Block.—Take a piece of hard wood about one foot long and three by four inches square, cut into it four inches from one end for about 1½ inches deep. Now take a slanting cut about four or five inches long, so as to remove a wedge-shaped piece. Use a draw

the blower for all kinds of work. I do horseshoeing and general repairing and I have welded a drill bar weighing 600 pounds in my fire with the tuyere iron only five inches below the level of forge, but for that heavy job I used some flag stone and raised the lever of the forge about 3 inches and got a good job. J. V. RANDALL.

To Forge a Gaff Hook.—Can some brother smith tell me how to forge the gaff hook shown in the engraving? My trouble is in welding the eye. Can some one tell me how to forge it with a solid band? The



HOW WOULD YOU FORGE THIS HOOK?

dimensions of the band and hook are: Length of hook, 5 inches; thickness of band, $\frac{1}{4}$ of an inch; diameter of band, 1½ inches. WM. H. RESPER.

A Progressive California Smith.—I want to say (not boasting) that there isn't anything in my several lines (general smithing, horseshoeing and machine work) that I cannot do. My plans are as follows: When I get a difficult piece of work to do, I don't get nervous over it, but study out a way of doing it before doing a stroke. When one has the job in mind it is half done.

I find one is never too old to learn. For example, if I have a man working for me who does a piece of work a new and better way than I do, I usually adopt his way immediately. GEO. F. WHERRY.

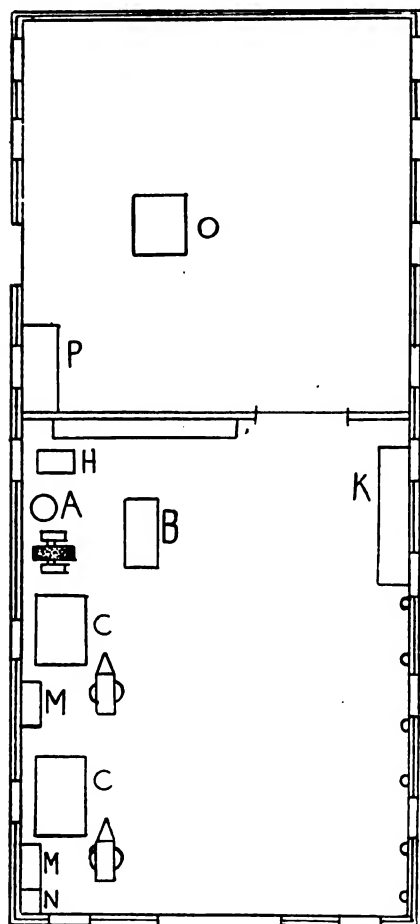
A Shoeing Question.—Will some brother smith tell me through these columns how to shoe a horse that has a drop sole, that is, the sole and horn have parted at the toe and the quick has worn through on the bottom about an inch from the frog. The hoof has turned up in front. I put a flat piece of saw plate under the shoe but he could not wear it at all. Next I made the shoe to fit just in front of the hole, cut the toe off and packed it with tar and cotton to keep the dirt out. I would like to have the opinion of other members of the craft upon this matter. C. R. SALISBURY.

Electric Power in a General Shop.—The accompanying engraving is a plan of our shop. The first or work room is 30 by 45 feet. The back or store room is 30 by 30 feet. I have plenty of windows, but not too many. I would advise every blacksmith intending to build, to put in large windows and have them in two parts so that the lower half can be raised and the upper half can be lowered. It is very

knife to cut the wedges the length you want them. Then split them crosswise of the grain and they will shave much easier and hold much better. A. ARMSTRONG.

Bellows and Blowers Again.—In reply to D. A. Duplisea in the June issue in regard to blowers vs. bellows, I would like to say that I have used both and very much prefer

essential to have plenty of fresh air in the shop. We have installed an electric motor of one horse-power, but where a person cannot get electricity I think that a good gasoline engine is as good. Now a word about power—Do not make the mistake of putting in too small an engine. If you contemplate getting power for your shop, estimate how strong an engine you will want. For instance, if you calculate that a two-horse power engine will do for your present wants, you will find it to your advantage to put in a heavier one, say five horse power, for as you get acquainted with your engine, find it always ready to do the work and not grumble, you will keep adding new machines from time to time and will not have to face the problem we have on hand. We are obliged to take out our motor and put in a larger one of five horse-power. Now to finish the description of our shop: A is a Western Chief drill; B is a Wells Bros. threading lathe; C, forges with Royal blowers; E, anvils; G, emery



A GENERAL SHOP OPERATED BY ELECTRIC POWER.

wheel; H, grind stone; I, iron rack; K, wood work bench; M, benches for blacksmith vises; N, bolt rack; O, band saw made by Silver Manufacturing Company; P, spoke rack. E. A. BARNARD.

How to Straighten a Round-edge Tire.—Lay the tire flat on anvil where it (the tire) is crooked. Strike it upon the flat side with ordinary hand hammer. Let the blow fall close to the edge toward which the tire crooks. Draw the tire toward or push it from you while the blows fall gently. This is the only way to straighten round-edge flat stock without marring the edges, and in this way a tire or steel plate, or even a long section of ordinary flat or band iron can be straightened more satisfactorily and easily. This may be old to some smiths, but there are a few young ones who don't know it. RICHARD O'HEARN.

A Letter of Appreciation.—I write to express my appreciation for the service which you have done me in helping me buy my outfit and for which please accept my thanks. I have bought a 2½-horse power Weber engine, Perfect trip hammer, a Buffalo down draft forge, an emery outfit from the Chicago Wheel & Mfg. Co., a Silver 32 inch band saw, a Silver power drill and a number of hand tools. These with the outfit I have on hand, I consider a pretty good set. I have a new shop with plenty of light and am getting all the business I can possibly do. You should have all the credit for this as I got it all out of THE AMERICAN BLACKSMITH. I cannot do without it. D. C. HOBSON.

Curing the Horse that Cross-fires.—In reading your July number, on page 199, I see that a brother requests someone to advance a device for cross-firing. There never was a case of cross-firing where the animal throws the hind foot clear off the ground to such an extent that the foot comes in contact with the opposite foot in front. He places the foot on the ground at the proper place, but going the gait he is required to go and the way and manner he is handling his feet, they do not stay where he places them. Therefore, in order to overcome the habit of cross-firing, get some device to hold the foot from sliding when he places it on the ground. A pacer that cross-fires always slides up and cuts his quarters after he has placed his foot on the ground.

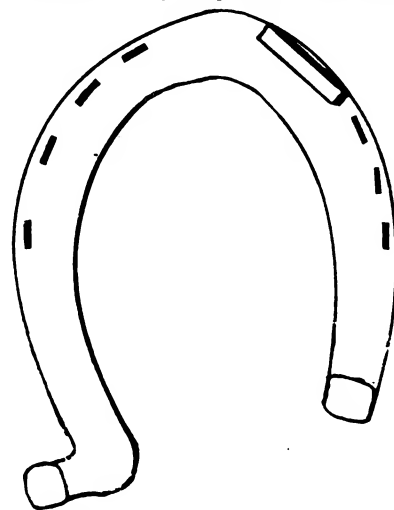
Here is my way of stopping a case of this kind and I will say I have never seen a case that this remedy failed to cure. Shoe your horse with the same weight as you have been using, but on the hind shoe make the outside heel about one inch longer and turn the heel square out as shown in the engraving. On the inside toe of the shoe and running parallel with it, place a toe about one inch long and the same height as the heel you have turned on the shoe. If this method is properly carried out, you will have to shoe your horse only about two or three times with this shoe when you can shoe him any way and he will not cross-fire. This is for the benefit of brother W. H. C. J. S. HITCHCOCK.

How to Temper Butcher Knives.—The following is my method of tempering butcher knives and I consider it very good: First refine the steel by hammering lightly at a dark heat, just about red. Now plunge into water three times or more and then heat blade just so it is not red. Now dip in linseed oil three times, heat the blade to orange and dip in linseed oil until cool. This hardens it as hard as it can be made by this plan. To draw the color, heat a good sized piece of iron, polish the blade so you can tell color easily. Draw the blade over the hot iron until it comes to a golden red and blue mixed. If this is done properly you will have no trouble with your knife checking or springing and it will hold its edge. L. F. STILLIANS.

Varnish Crawling on Ivory Black.—In answer to H. V.'s query as to varnish crawling on ivory black, would say the cause of this is that the black is much overbound. When bought already ground in Japan, it should only be thinned with turpentine before using. Never use black with oil in it. Why not buy the black ground in turpentine, bind it yourself with Japan or varnish? This is the best method. Use the black rather underbound, or "sharp" as we call it, than overbound or "fatty." To know if black will take without crawling, just rub a spongy of clean water over one panel. If the water takes, so will varnish, but if the water runs off as it would from a newly finished panel, the black must be rubbed very lightly with a damp sponge dipped in the

pumice powder and then washed off clean. Valentine's, of New York, sell a good ivory black. W. DUDLEY WALKER.

A Jack-of-all-trades.—There is nothing ever comes to my shop that I turn away.



CURING THE HORSE THAT CROSS-FIRES.

Of course here it is principally farm work. In spring, work consists of plow work, sharpening, painting, horse shoeing and cultivator work. From July 1 to July 15, mowers are worked over, hay loaders mended, hay loaders made, old wagons fixed up, and other miscellaneous work. From July 15 to December, wagons and buggies repaired, wagons and buggies are cut down and painted, wheels filled, new wagon tongues put in, corn cutters sharpened and mended.

My side lines are cleaning and mending gasoline stoves, clocks, watches, sewing machines, lawn mowers and repairing all kinds of musical instruments, guns and revolvers. In fact when there is anything in the county that needs repairing, I am called upon to do it. I also hone razors and run a barber shop in connection with my blacksmith shop. I take impressions of any kind of locks and make keys. I have also been called to open combination safe locks. So far I have always met with success.

I only state these few items as an example of what we can do. There is always something to do and you need never be idle when once you get the reputation of turning nothing down. It is a greater advertisement than all the newspaper publicity combined.

This may not interest you much, brother craftsman, but I hope that it will put some excellent thoughts into the minds of the young craftsmen just starting. I send you some prices of the work I do:

Horse shoeing new, per pair.	.....	\$ .80
" " old, " " " "	.....	.40
Bar shoes, per pair.	.....	.75
Plow sharpened, 12, 14, 16-inch.	.....	.25
" pointed.	.....	\$ .75 to 1.00
Cultivator shovels sharpened.	.....	.40
" " pointed.	.....	2.00
Wagon or buggy tires set.	.....	2.00
Wagon or buggy tongue	\$2.00 to	2.50
Buggy stubs, per set.	.....	8.00
Wagon axle.	.....	3.00
Bolster, each.	.....	1.25
Cutting wagon down.	.....	8.00
Cutting buggy down.	.....	6.00
Putting on new sickle head.	.....	.50
Cutting mower down 6 to 5 feet.	.....	1.50

Railroad work, whether 20 minutes or 2 hours, all goes for one day's work, \$1.50. Over two hours I charge as much as I want to. I always use the best of iron or steel and always splice when making a weld with new iron. L. E. PHIFER.

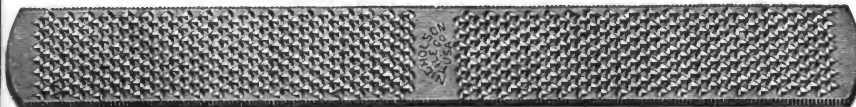
NICHOLSON FILE COMPANY



PROVIDENCE, R. I.

U. S. A.

MANUFACTURERS OF



FILES AND RASPS

Blacksmiths Recommend Our Rasps

— BECAUSE —

THEIR WEARING QUALITIES HAVE BEEN PROVEN.

V STANDS FOR **VULCAN**;
POWERFUL AND STRONG,
IF YOU USE —

Vulcan Horse Nails
YOU CAN NEVER GO WRONG.

...

THE QUALITY OF VULCAN
HORSE NAILS IS FULLY GUARANTEED

THE FOWLER NAIL CO.
SEYMOUR, CONN.
SOLE MANUFACTURERS



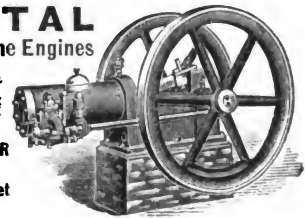
DEATH TO HEAVES! NEWTON'S
GUARANTEED

Heave, Cough, Dis-temper and Indigestion Cure will effect a permanent cure for the ailments named. Recommended by veterinarians and owners. Every druggist in America has it or can get it.
Send for Booklet.
\$1.00 per can, of dealers, or express prepaid.
THE NEWTON REMEDY CO., TOLEDO, OHIO.

CAPITAL Gas & Gasoline Engines

We will sell a sample 3½ H.P. engine at half price.

C. H. DISSINGER
& BRO.
400 Helm Street
Wrightsville, Pa.



"CHICAGO" EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO" WHEELS SAVE TIME

They're made
of stuff that cuts

Emery Wheels, Glue, Emery, Pol-
ishing Wheels, Grinding Machinery
136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.

42 W. RANDOLPH ST.
CHICAGO, U. S. A.

Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., July 26, 1906, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.			
$\frac{1}{2}$ in., round or square,	Iron, \$2.80;	Steel, \$2.90	
$\frac{3}{4}$ in., " " " "	" 2.40	" 2.50	
$\frac{1}{2}$ in., " " " "	" 2.20	" 2.30	

Flats—Bar and Band.			
$\frac{1}{2}$ x 1 in., Iron	.....	\$2.90;	Steel.....\$2.90
$\frac{1}{2}$ x $\frac{1}{2}$ in., " "	.....	2.20;	" 2.20
$\frac{1}{2}$ x $\frac{1}{2}$ in., " "	.....	2.40;	" 2.40

Norway and Swedish Iron.			
$\frac{1}{2}$ in., round or square	.....	\$4.90	
$\frac{3}{4}$ in., " " " "	.....	4.50	
$\frac{1}{2}$ in., " " " "	.....	4.80	
$\frac{1}{2}$ x $\frac{1}{2}$ in., " "	.....	4.80	
$\frac{1}{2}$ x $\frac{1}{2}$ in., " "	.....	4.20	

Horseshoe Iron.			
For No. 1 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in.	.....	\$2.50	
For No. 2 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in.	.....	2.50	
For No. 3 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in.	.....	2.50	
For No. 4 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in.	.....	2.50	

Toe Calk Steel.			
$\frac{1}{2}$ x $\frac{1}{2}$ in. and larger	.....	\$3.00	

Spring Steel.			
$\frac{1}{2}$ to $\frac{1}{4}$ in. Rounds, Op. Hearth	.....	\$3.00, Crucible	\$5.00
$\frac{1}{4}$ to $\frac{1}{2}$ in. by No. 4	.....	" 3.00,	" 5.00
gauge to $\frac{1}{2}$ in. Flats	.....	

Carriage Bolts. (Net Price per Hundred.)			
$\frac{1}{2}$ x 2 in.	.....	\$0.54	$\frac{3}{4}$ x 2 in. ....\$0.82
$\frac{1}{2}$ x 2 1/2 in.	.....	.58	$\frac{3}{4}$ x 2 1/2 in. .... .96
$\frac{1}{2}$ x 3 in.	.....	.62	$\frac{3}{4}$ x 3 in. 1.31
$\frac{1}{2}$ x 3 1/2 in.	.....	.65	$\frac{3}{4}$ x 3 1/2 in. 1.70
$\frac{1}{2}$ x 4 in.	.....	.75	$\frac{3}{4}$ x 4 in. 2.10



EXTENSION NUTS SENT ON AXLE APPROVAL
Cure wabbles and make old buggies run like new. Samples free to agents. (Profitable).
Hardware Specialties Co., Box 1120, Pontiac, Mich.

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

The Campbell Iron Co.
ST. LOUIS, MO.

Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.

WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write us your requirements.

THE
Williams Hardware Co.
Minneapolis, Minn.

Wholesale IRON, STEEL and HEAVY HARDWARE.

CARRIAGE AND WAGON WOODSTOCK.

HORSESHOERS' SUPPLIES.
Send us a Sample Order.

Md. Phone, Courtland 2128. C. & P. Phone, Mt. Vernon, 3193.

R. MILTON NORRIS
Successor to C. T. & C. B. Mackenzie.

Carriage and Wagon Goods
Manufacturer of
ROUGH WAGON POLES, CART SHAFTS AND SILLS

520 West Baltimore St., Baltimore, Md.
(Annex, 5 N. Diamond Street)

Agent for Skelly's Celebrated Norway Phila. Eagle Carriage Bolts.

Steel and Cast Skells. Iron and Steel.
WRITE FOR LOWEST PRICES.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents.

FOR SALE—One House Cold Tire Setter. Address, C. W. WOEBER, Denver, Colo.

FOR SALE—Brooks' Cold Tire machine, cheap, almost new. C. P. JENKINS, Tulsa, I. T.

FOR SALE—One 16-inch Buffalo Forge Co. Fan. Good as new. Cheap. A. D. GORE MFG. CO., Sinnermahoning, Pa.

FOR SALE—Reasonable. Horseshoeing business in town of 20,000. Shop rent cheap. Address, G. M. WELCH, Kewanee, Wash.

FOR SALE—Blacksmith and shoeing business, shop run by power. A bargain if sold at once. H. HARTMAN, Madison, Ill. (Box 153.)

FOR SALE—Blacksmith and wagon shop, two story, 22 by 40 feet. Horseshoeing stock. Six room house. For full particulars, address, L. M. Krick, Pls, Ind.

WANTED—To correspond with a good all-around blacksmith who is used to all kinds of work in a country shop. Address, ALPHA JONES, Oregon, Ill.

FOR SALE—Woodworking and Blacksmith shop with tools complete, in good location. Receipts for last 12 months over \$1,400. Will sell cheap. Address, J. W. TRIPLETT, Hastings, Iowa.

FOR SALE—On easy terms, shop and business in center of prosperous town of Oregon. Business established four years, averages \$2,900 yearly. Equipped in up-to-date manner. Good reason for selling. JOHN P. JONES, Richland, Ore.

FOR SALE—The best modern equipped horseshoeing and repair shop in Genesee County. Ten h. p. engine and wood cutting machines, power hammer, one power force. Doing \$4,000 yearly. Sell because I can live without it now. Address, Box 56, Elba, N. Y.

FOR SALE—A lot of tool steel. Sizes $\frac{1}{2}$ by $\frac{3}{4}$; $\frac{3}{4}$ by $\frac{1}{2}$; $\frac{1}{2}$ sq. $\frac{3}{4}$ by $\frac{1}{2}$, in lengths 8 to 10 inches. Just the thing for chisels, horseshoe punches, re-steeling, picks, or for any purpose where good steel is required.

ARTHUR D. GORE MFG. CO., Sinnermahoning, Pa.

WANTED—I want 1,000 blacksmiths to try my Cast Iron Brazing Compound, and to the first 1,000 sending me express money order for one dollar I will send them a \$2.00 package and a due bill good for another dollar's worth, which makes the two dollar package cost you nothing. Only 1,000 sold at this price. Send TODAY. Satisfaction guaranteed. A. W. WAYCHOFF, Culver, Kans.

FOR SALE—Second Hand Lathes. We have just received a carload of the best lathes that were ever put on the market. They have been slightly used and every one of them is in good condition. We also have a few planers and drills that you cannot tell from new; also several good second-hand gasoline engines. Write for prices and catalogues. ALLEN P. ELY & CO., 1110 Douglas St., Omaha, Neb.

MY FREE BOOK

Is called "How Money Grows" and tells: How to tell a good investment; how to invest small sums; how you can convert \$100 into \$358.33; how to guard against poor investments, etc., etc. If you are able to save \$10 or more a month from your income you should not fail to own a copy. NOT AN ADVERTISEMENT of any investment but full to the brim with information that everyone should possess before they invest a dollar. Ask for it on a postal and I'll send it FREE by return mail. W. M. OSTRANDER, 109 North American Bldg., Philada.

New Books.

PRACTICAL PERSPECTIVE by Frank Richards and Fred H. Colvin is a late publication setting forth the principles of isometric perspective and the uses of isometric paper. Mr. Richards' explanation of the principles of "The only practical perspective" as he calls it, is clear and pleasingly free of elaborate technical phrases. Mr. Colvin's "Uses of isometric paper" explains the many uses to which this special paper can be put. The use of this paper makes the drafting of working sketches and plans very simple even to the inexperienced craftsman.

This book is published by The Derry-Collard Co. of New York City and will be supplied either by them or THE AMERICAN BLACKSMITH COMPANY at the cost of 50 cents.

Trade, Literature and Notes.

A SET OF NEAT CIRCULARS, with half-tone illustrations of several different styles of punches, shears, etc., has been received from the Badger State Machine Co. of Janesville, Wisconsin. If you intend to increase your shop equipment and add some good machinery, it will pay you to send for these leaflets. They give a detailed descrip-

tion of the different styles and sizes, besides showing a table of the weight and capacity of the several machines.

ANOTHER ADDITION to our advertising columns may be seen by referring to page XVI, wherein the Minogue Body & Seat Co., of 2121 Broadway, Kansas City, Mo., call attention to the fact of their making all kinds of vehicle bodies in the white. They have been established and in operation for over three years, and will move into a new plant with greatly enlarged and increased facilities soon. Interested parties may have a catalogue by addressing them as above.

"SOME REASONS WHY" is the unique title of a handsomely illustrated booklet recently received from the Otto Gas Engine Works of Philadelphia, Pa. This pamphlet is especially interesting to the smith who contemplates purchasing an engine, for it describes in detail all the working parts of the Otto engine, and points out the merits of these products. Otto engines have an enviable record, having won many prizes in competition, and it is claimed that there are nearly one hundred thousand in use throughout the world.

THE KNEELAND MFG. CO. of Lansing, Mich., have sent us a neat, twenty-page catalogue, handsomely illustrated and containing much valuable information concerning Kneeland engines. All the working parts of these engines are carefully described, giving in detail the many points of excellency which have won so broad a reputation for these products. Their "clock-like accuracy," simplicity, durability and beauty of design, are mentioned in a long list of special features. A copy of this catalogue will be sent free upon request to AMERICAN BLACKSMITH readers.

INTERESTING LITERATURE received from the Double Power Mill Company of Appleton, Wis., contains strong testimonials as to the efficiency of Double Power Windmills. After a thorough test by the Chief of Irrigation and Drainage Investigations, the United States Government has installed several of these mills on the experimental farms in the West.

Blacksmiths find opportunities for big profit in securing the agency of a reliable windmill concern as a sideline. We advise our readers to write to the manufacturer for details.

THE 1905 CATALOGUE OF CRAY BROS. of Cleveland, Ohio, contains a complete list of carriage and wagon materials and blacksmiths' tools and supplies. A copy of this catalogue will be mailed, free of charge, to blacksmiths upon request, and is a very handy book to have around the shop. Cray Bros. carry quite a complete stock in all departments, and fully guarantee their products, giving purchasers the privilege to return any goods not found exactly as represented or entirely satisfactory. See page V. for special drill offer made to AMERICAN BLACKSMITH readers this month.

THE ROBERTSON MFG. CO. of Buffalo, N. Y., have added to their automatic gas and gasoline engine a sparking device of the wipe type operating from the cam gear and making a spark every second revolution when running under full load. A recent circular describes the engine as being very easy to operate, the whole construction being quite simple. When the governor acts, the current is cut off automatically. A steel connecting rod operates the shaft having the ignition point which is a tempered tool steel plate $\frac{1}{4}$ -inch wide wiping another steel plate at right angles at every second revolution of the main shaft.

THE PRESENT YEAR marks the fiftieth anniversary of Phineas Jones & Company of Newark, N. J. Since 1855 this firm has been identified with the wheel manufacturing business, and has established a world-wide reputation by the quality of its products. The late Phineas Jones, who was at one time a member of the House of Representatives, was one of the first men to start the manufacture of wheels by machinery, west of New England. His business policy from the very start was to give his customers the best value for their money. In 1884 the Hon. Phineas Jones died and was succeeded by his son, Henry P. Jones, who is the present head of the firm, and who has done much to advance the interests of the wheel industry throughout the country. It is rather a remarkable fact that during its fifty years of business, this firm has never experienced any labor troubles, and has men in its employ who have been with it since 1858. This record is most creditable to both employer and employee.

THE NATIONAL CEMENT & RUBBER MANUFACTURING CO. of Toledo, Ohio, are offering to the trade a high pressure brazing forge which is enjoying much popularity. It is constructed so as to do a wide range of work and is said to be especially suited for the brazing of automobile parts. A cut of this forge is shown on page IX. It is fitted with hydro-carbon adjustable burners, and with a heavy cast iron tray supported by substantial standards. It also has a 10-gallon galvanized iron tank, tested to 150 pounds' pressure. The lower burner is constructed so that it can be swung entirely clear from underneath the pan, yet when in operation, is midway between the two burners. By filling the cast iron tray with coke and applying the center burner a complete blacksmith's forge is produced.

The 1905 catalogue of the National Cement & Rubber Mfg. Co., containing a complete description of this forge and many other products of this concern will be sent free to blacksmiths upon request.

ALLEN-RANDALL BOLT CLIPPER



ALLEN-RANDALL CO., Springfield, Mass.

WE WANT A BLACKSMITH OR WAGONMAKER

in every town to act as agent for our
PERFECTION SHAFT HOLDER

A new idea in holding up shafts. Fills a long-felt want. Endorsed by all who have used them. Nothing to get out of order. Nothing to wear out. Always ready for use. Can be used on any style of light vehicle!

We will send you an agent's sample, express prepaid, for 25 cents.

They sell to all vehicle owners on sight. You can make a nice profit selling the Perfection to your customers, especially to liverymen. **WRITE AT ONCE FOR SAMPLE.**

CITY CARRIAGE WORKS, Fort Wayne, Ind.

No. 112 DRILLS

Fitting Silver & Deming's and Prentice Blacksmiths' Drill Presses Nos. 1 and 2, Short Lengths.

Style No. 1



Style No. 2



Shanks 1/2 inch diameter, 2 1/4 inches long. Style No. 2 always furnished unless otherwise ordered.

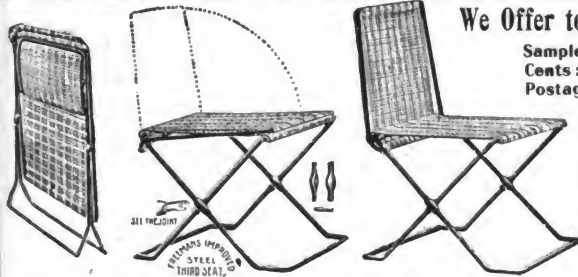
Morse Twist Drill and Machine Company

NEW BEDFORD, MASS.
U. S. A.

Makers of
Twist Drills, Reamers,
Chucks, Cutters, Taps,
Machines,
Dies, Machinists' Tools.

We Offer to Send by Express Prepaid

Sample Seat Without Back for 75 Cents; With Back, \$1.00. Remit Postage Stamps or Money Order



Freeman's Improved Steel Third-seat leads. Why? Because it has a 10-inch back; when locked with the catch-button making the chair back perfectly rigid. No child's chair is perfect without a back; when folded makes the third seat or hassock complete, and will close perfectly compact when not in use. The seat is strong, practicable and durable.

These Third-Seats made with or without back.

MANUFACTURED BY

THE GEORGE B. FREEMAN MFG. CO., RACINE, WISCONSIN

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3 1/4 " 14 "
" 3, 3 3/4 " 10 "
Price, \$1.65 per set of 4 stks
Cash with order. Weight, 16 lbs.
per set.



This shows the strength of our **STANDARD** compared to the old style.

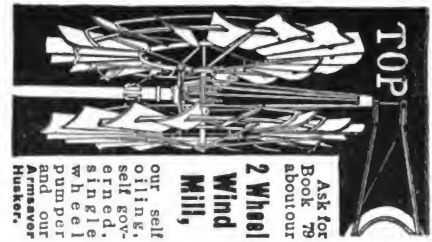
The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3 1/2 in. face at base, which prevents wear on wagon box, while the old style has only a 7/8 inch face.
4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.



Double Power Mill Co., Appleton, Wis.

CASH Always Secures **BARGAINS** and **ALWAYS WILL**
Special Net Price on Sarven Patent Wheels (C. B. 50c. extra) with steel and rubber tire

Size of tread	Price per set for wheels with flat steel tires on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored			Add to price of wheels for axles and boxes set
		36 and 40	38 and 40	40 and 44	
3/4	\$5.75	\$14.50	\$15.00	\$15.50	\$1.90
1	5.85	15.50	16.00	16.50	1.90
1 1/4	6.10	17.50	18.25	19.00	2.10

Both wheels and rubber guaranteed. Repair Wheels, \$3.50. PROMPT SHIPMENTS. Five set or more, one order, you can deduct 25c. per set as freight allowance. Write for catalogue. We manufacture wheels with Steel or Rubber Tire on, 3-4 to 4 inch tread. Buggy Gears, with wheels and shaft all ready for body, \$16.95 delivered.

The A. Boob Wheel Co., Cincinnati, O., U. S. A.

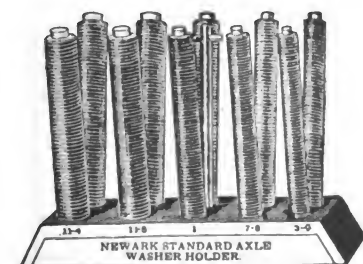
A Hard Nut To Crack

The choice of mediums is the hardest nut for the advertiser to crack. It cannot be decided without studious consideration and there are few rules to go by. The amateur advertiser often arrives at a decision by arraying rate-cards against circulations, and then by a series of mathematical calculations chooses certain mediums from the standpoint of economy. This brand of economy has no berth in the successful advertiser's campaign. The basis upon which to decide in favor of a certain medium is RESULTS. They are what you are after, and when The American Blacksmith "pulls" 98 replies for an advertiser as against 37 for the same ad in a like publication, we are of the opinion that the basing of selection upon RESULTS points strongly to The American Blacksmith.

It goes to 25,000 down-to-the-minute smiths every month of the twelve. Ask for proof of the above

The American Blacksmith, Buffalo

SOLID LEATHER AXLE WASHERS



A novelty in our Patent Axle Washer Holder. Holds 500 Newark Standard Axle Washers.

Washers are our specialty. We make washers for every axle on the market. Also a full line of

Pump Leathers and Leather Horseshoe Soles.

Write now for Prices, Illustrated descriptive circular and **FREE SAMPLE of Our Washers** and mention this publication.

If your dealer cannot supply you we will send you one of our racks along with 500 Standard Axle Washers, Express prepaid, on receipt of \$3.00

The Newark Leather Washer Mfg. Co., Newark, N. J.

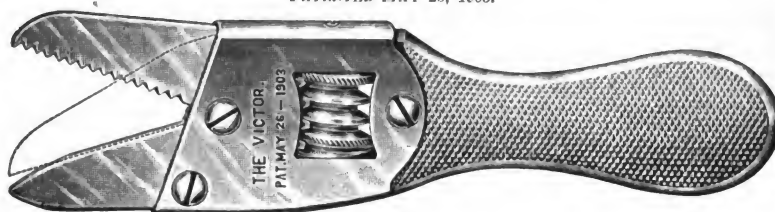
TIME SAVED IS MONEY IN YOUR POCKET

THE VICTOR

ADJUSTABLE ALLIGATOR WRENCH

PATENTED MAY 26, 1903.

**Drop Forged
of Best
Tool Steel**



**MOVABLE
JAW**

IS A TIME AND MONEY SAVER

By passing the thumb over the screw it may be adjusted five-times faster than any other wrench. It will take the place of a monkey wrench. May be used as a pleyer—will do the work of a pipe wrench.

Combines strength, simplicity and rapidity of adjustment. No springs to break. Cannot get out of order. Every part visible.

Perfectly hardened and tempered. Absolutely guaranteed.

All objections to alligator wrenches overcome.

A high grade tool for plumbers, gas and steam fitters, wagon smiths, machinists and mechanics of all kinds.

The movable jaw, which is of the best steel, IS INTERCHANGEABLE, and may be replaced easily in case of wear or breakage.

Made in three sizes, full nickel plated,

7 in.	8 in.	10 in.
\$1.00	\$1.25	\$1.50

The 7 in. size is also made in dull black finish with polished jaws.

Extra Movable Jaws	7 in.	8 in.	10 in.
	.25	.35	.50 each.

OUR 30 DAYS' FREE TRIAL OFFER

If your dealer does not handle the Victor Adjustable Alligator Wrench, we will send prepaid a 7 in. full nickel or black finish Victor Adjustable Alligator Wrench for

\$1.00

Test it 30 days. If not fully satisfied return it and get your money back.

Write for our special offer for club orders of 6 or 12 wrenches

ACME HARDWARE CO.

MANUFACTURERS OF HIGH GRADE TOOLS

35 LITTLETON AVENUE, NEWARK, N. J., U. S. A.

"THE BEST IS NONE TOO GOOD"

WE GUARANTEE

OUR

"COLUMBIAN" ALL-STEEL ANVILS

to be so constructed as to stand the most rigid test of long and severe service.



These anvils are built on scientific lines and have that "true ring" which superior quality alone can produce. Made of special steel, by the most skilled workmen. We not only claim that they are the most durable but place back of each and every anvil a WRITTEN GUARANTEE.

DROP US A POSTAL FOR PRICES AND INTERESTING VISE AND ANVIL CATALOGUE No. 16.

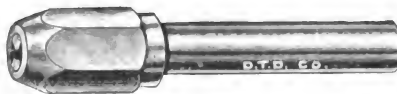
THE COLUMBIAN HARDWARE CO.

MANUFACTURERS
CLEVELAND, OHIO, U. S. A.

WHY NOT BUY A CHUCK

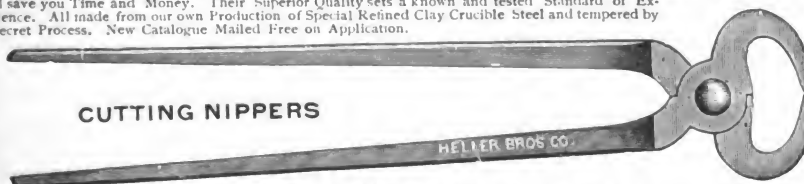
That will fit the spindle of your drill press, holding drills $\frac{1}{2}$ to $\frac{1}{4}$ in. inclusive, with reducer to $\frac{3}{8}$ in. Drills held by this chuck are much cheaper than drills with $\frac{1}{4}$ in. or $\frac{3}{8}$ in. shank. Simplest and cheapest chuck on the market.

WRITE FOR CATALOGUE AND PRICES



DETROIT TWIST DRILL CO.
228 21st Street, Detroit, Mich.

"Tools That Wear" **HELLERS' CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIERS' TOOLS**
will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



HELLER BROS. CO., Newark, N. J., U. S. A.

(A Lady can hold him.) **THE BEERY BIT**
FOUR BITS IN ONE
Cures Kickers, Shyers, Bolters, Pullers and Runaways.
There are four distinct ways of using it. They sell at sight. Agents make big money selling them. One agent writes: "I am leaving the farm to devote my entire time to the sale of the bit." Send postal for terms to agents.

Prof. W. Beery, Pleasant Hill, Ohio.
A great many Blacksmiths are selling the bits just by showing them to their regular customers at their shops.

LOTS AND LOTS OF BLACKSMITHS

have sent us in one or more new subscribers to the paper. **HAVE YOU?** If not, why not secure one new subscriber to THE AMERICAN BLACKSMITH this month and let us extend your subscription six months as a reward? What do you say?

AMERICAN BLACKSMITH COMPANY
BUFFALO, N. Y.

A COMPLETE LINE OF
Carriage Tops
and Trimmings
Seventeen different grades of tops
All good ones.
Prices right.
Ask for No. 5 Catalogue
C. A. HALLIDAY, 24 Cedar St., Oneida, N. Y.

THE WHEEL OF TIME
for all time is the....
Metal Wheel
We make them in all sizes and varieties, TO FIT ANY AXLE. Any height, any width of tire you may want. Our wheels are either direct or stagger spoke. Can FIT YOUR WAGON, Perfectly without change....
NO BREAKING DOWN
no drying out, no resetting tires
CHEAP because they endure.
Send for catalogue and prices.
Electric Wheel Co.
P. O. Box A Quincy, Ills.

Blacksmiths' Tools and Machinery

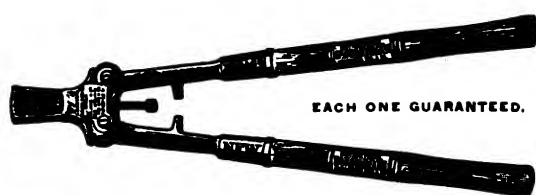
Wagon Builders' and Horse-shoers' Supplies.

Everything Used by the Smith,
Whether made of Iron, Wood or Leather.

Manufacturers of

A. M. W. Whiffletree hooks and soft or hardwood body makers' plugs. Write us

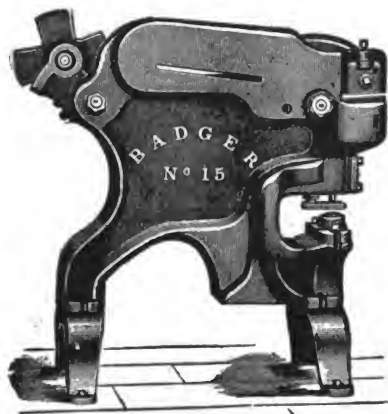
A. M. Wood Company,
51-53 Beverley Street,
BOSTON, MASS.



EACH ONE GUARANTEED.

BOLT CLIPPERS**CHAMBERS BROS. CO.,**N. Fifty-Second Street,
Philadelphia, Pa.**WHAT? YES!**No. 15 **THE BADGER** No. 15

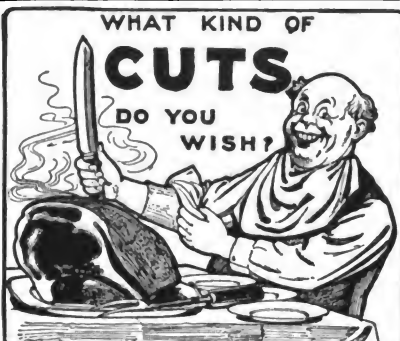
Will punch $\frac{1}{2}$ " hole in $\frac{1}{2}$ " iron.
Will shear $\frac{1}{2}$ " by 4" flat iron.
Will shear 10" by $\frac{1}{2}$ " band iron.
Will shear 1" round bars.



Weight 800 Lbs.

CAN YOU BE WITHOUT ONE?

Write for Catalogue and prices.

ROCK RIVER MACHINE CO.
JANESVILLE, WIS., U. S. A.

CUTS for Circulars, showing exactly what is needed.
CUTS for Booklets, making the matter plain and interesting.
CUTS for Catalogs, illustrating the article clearly.
CUTS for Street Car Cards, attractive and attention-compelling.
CUTS for any purpose, and all of the highest quality.

Three-Color Half-Tones a specialty.

ASK TO SEE SAMPLES OF OUR WORK.

BUFFALO ENGRAVING COMPANY,
Cor. S. Division and Ellicott Sts.
BUFFALO, N. Y.**The Ideal Steel Center Toe Calk**

Write for Circular and Prices.

THE WEYBURN COMPANY
Rockford, Illinois.**STARRETT TOOLS**THE
STANDARD
FOR

ACCURACY, DESIGN, WORKMANSHIP, FINISH,

L. S. Starrett says:

"If you find any better tools than Starrett Tools—buy them."

HACK SAWS**STARRETT QUALITY.**

Complete Catalogue No. 17 AH. sent on request. You ought to have it.

THE L. S. STARRETT CO.,
ATHOL, MASS., U. S. A.**Cortland Welding Compound Co.****CORTLAND, N. Y.**

Manufacturers of

Climax Welding Compound,
Cherry Heat Welding Compound,
and BORAX--ETTE.



BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

SAMPLES FREE.FOR SALE BY DEALERS IN **BLACKSMITHS' SUPPLIES****Two Good Works on Horseshoeing**

A Text Book on Horseshoeing, by A. Lungwitz. A complete treatise on anatomy, shoeing, bad feet, interfering, etc. Cloth bound, 168 pages, 141 illustrations..... **\$2.00**

Magner's A B C Guide to sensible horseshoeing. Cloth bound, 130 pages, 400 illustrations..... **1.00**
Sent postpaid on receipt of price.

IT TELLS YOU HOW TO PAINT

carriages, wagons and sleighs. Gives full directions for all kinds of work. Full of good receipts and useful hints.

Practical Carriage and Wagon Painting

A new enlarged edition of a standard book by M. C. Hillick, price, postpaid..... **\$1.00**

AMERICAN BLACKSMITH CO., Box 974, Buffalo, N. Y.

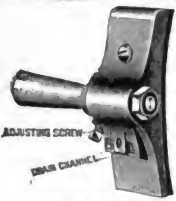
THE

Little Giant**Combined Punch and Shear.****The Most Powerful Lever Punch and Shear Made.**

This is not a new machine—only a new cut showing the improvements we have lately added—making it more valuable for the blacksmith. It is made in three sizes. No. 1 will punch $\frac{3}{8}$ in. hole in $\frac{1}{2}$ in. iron; cuts iron $\frac{3}{8}$ in. thick and 1 inch round. Weight, 500 lbs. No. 2 will punch $\frac{1}{2}$ in. hole in $\frac{1}{2}$ in. iron, cuts iron $\frac{1}{2}$ in. thick and $\frac{3}{4}$ in. round. Weight, 350 lbs. No. 3 will punch $\frac{1}{2}$ in. hole in $\frac{3}{4}$ in. iron, cuts iron $\frac{3}{4}$ in. thick and $\frac{3}{4}$ in. round. Weight 275 lbs. Each machine is equipped with five sets of punches and dies. This machine is made for the blacksmith shop and we DO claim that it is decidedly the best on the market for that place, and can furnish any amount of testimonials to that effect.

For Sale by your Jobber. If Not Write Us. Send for Circular.

LITTLE GIANT PUNCH & SHEAR CO., Sparta, Ill.



Potters Spring Brake Blocks

For Vehicles of all kinds with STEEL OR RUBBER TIRE.
Have a record of excellency for seventeen years. **• • •**

The MORGAN POTTER CO.

SOLE MANUFACTURERS.

CATALOGUES.

FISHKILL ON HUDSON, N. Y.



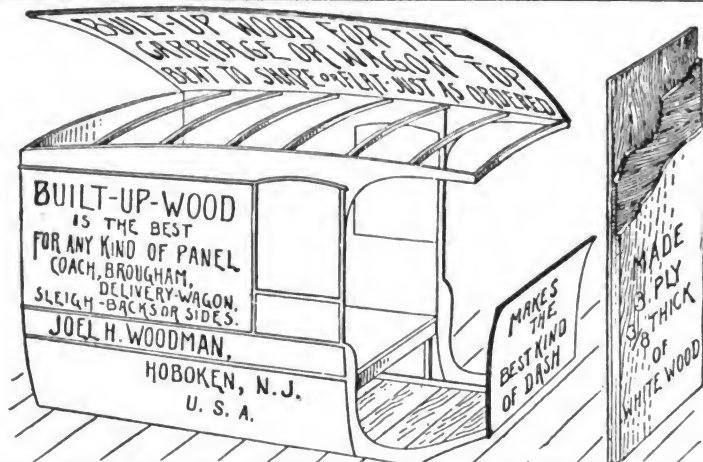
Across
Lake Erie
Between
Twilight
and
Dawn

THE D. & B. Line Steamers Leave Detroit daily at 5:00 p. m. (central time) and Buffalo daily at 5:30 p. m. (eastern time), reaching their destination the next morning after a cool, comfortable night's rest en route. By special arrangement all classes of tickets reading via the Michigan Central, Wabash and Grand Trunk Railways, between Detroit and Buffalo, in either direction, are optional and will be accepted for transportation on the D. & B. Line.

Detroit & Buffalo Steamboat Co.

A. A. SCHANTZ,

Gen'l Supt. & Pass. Traf. Mgr.
Detroit, Mich.



Less Work and More Money

A GUARANTEE MADE TO USERS OF

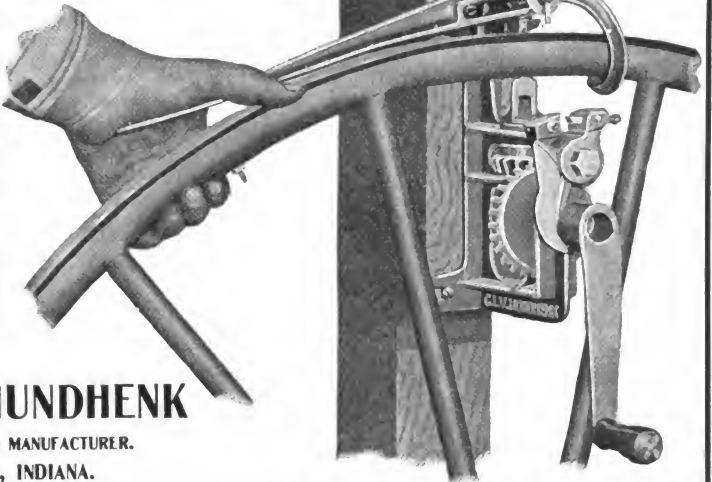
The Mundhenk Tire Bolting Machine

Mundhenk's Tire Bolter is the Only Machine that Will Successfully Remove all Burrs, Run Them On or Clip Ends off Tire Bolt Perfectly Smooth in 2 minutes' time.

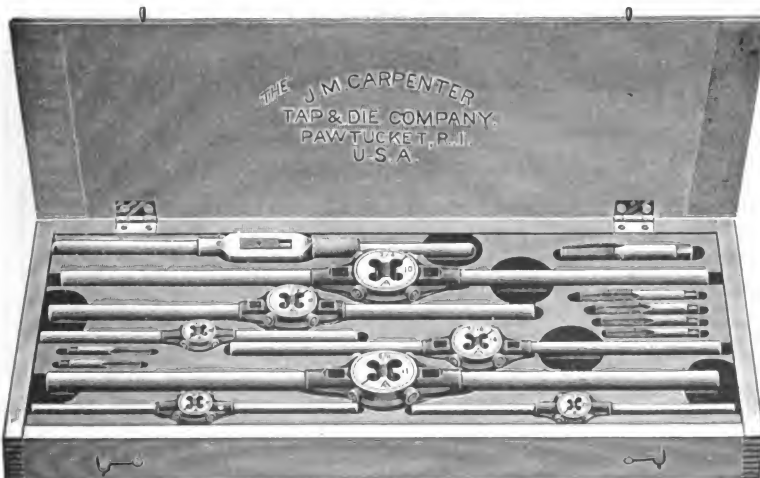
Send for one of our interesting circulars and let us tell you all about it.

C. L. V. MUNDHENK

INVENTOR AND MANUFACTURER.
MARION, INDIANA.



Easily operated. Made of Malleable Iron. Constructed to fit any size nut. A labor saving machine for up-to-date shops.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

Send for catalogue

The J. M. Carpenter Tap & Die Co.

Pawtucket, R. I., U. S. A.



TALKING ABOUT

SCREW CUTTING TOOLS AND MACHINERY

THERE'S ONE BRAND

TAPS, DIES
Little Giant
SCREW PLATES

THAT NEVER FAILS TO GIVE THE BLACKSMITH PERFECT SATISFACTION.
BEST MATERIAL, FINEST WORKMANSHIP — QUALITY, THAT'S THE SECRET.

LITTLE GIANT SCREW PLATES

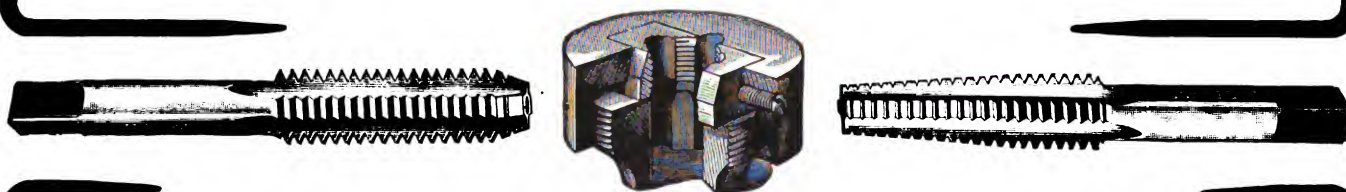
make perfect threads at a single cut. They do the most accurate work, and the threads they form are cut, not bruised. Our dies are made of flat steel, the best quality material used in all their parts.



ALL OUR SCREW PLATES ARE FURNISHED
WITH ADJUSTABLE TAP WRENCHES.

LITTLE GIANT TAPS AND DIES

are fully guaranteed to give the biggest value for your money. They will last long, cut clean, fast and accurate, and after first trial you will use no other. They are the only kind for the skilled mechanic.



WE MAKE

Taps
Wrenches
Bolt Cutters
Nut Tappers
Dies of All Kinds
Thread Cutting Tools

SEND NAME AND ADDRESS

And we will mail free of charge a complete and interesting catalogue of all styles of Little Giant Tools. Write today.

WE MAKE

Reamers
Butterises
Tire Wheels
Axle Setters
Farriers' Tool Boxes
Adjustable Tap Wrenches

WELLS BROS. COMPANY

GREENFIELD, MASS.

NEW YORK STORE, 56 READE ST.

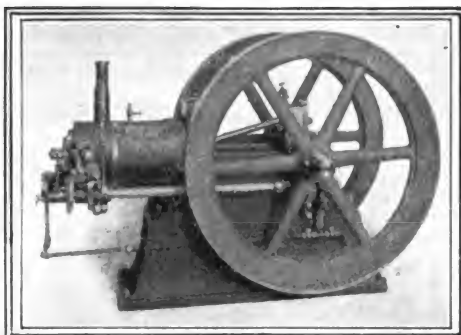
LONDON STORE, 149 QUEEN VICTORIA ST.

WEBER ENGINES



WEBER ENGINES

All Blacksmiths who use our engines are ready to endorse them. The efficiency of **Weber Engines** is due to the quality of material and workmanship and the care taken in their construction. That's why they stand the test of long, severe service and why they are the favorite for shop work.



5 H. P. Weber Engine, for Blacksmith, Wagon and Carriage Repair Shops.

Built from 2½ to 300 H. P. Our 2½ and 5 H. P. Engines are especially suited for Blacksmith, Wagon and Repair Shops. They require but a few minutes' attention each day and are the simplest and easiest to operate. Every **Weber Engine** is rigidly tested before leaving the shop. Read our guarantee below. It covers everything.

Every WEBER ENGINE is fully guaranteed. We agree to replace, free of charge, any defective parts, F. O. B. our works, for two years. Our engines operate on 1-10th of 1 gal. of gasoline per H. P. per hour.

Huntington, Pa.

Gentlemen:—The Weber Jr. engine purchased from you over two years ago has given very best results. I use the engine to run a pony planer and circular saw and it takes the place of two men, so you can see what a money and labor saver it is.

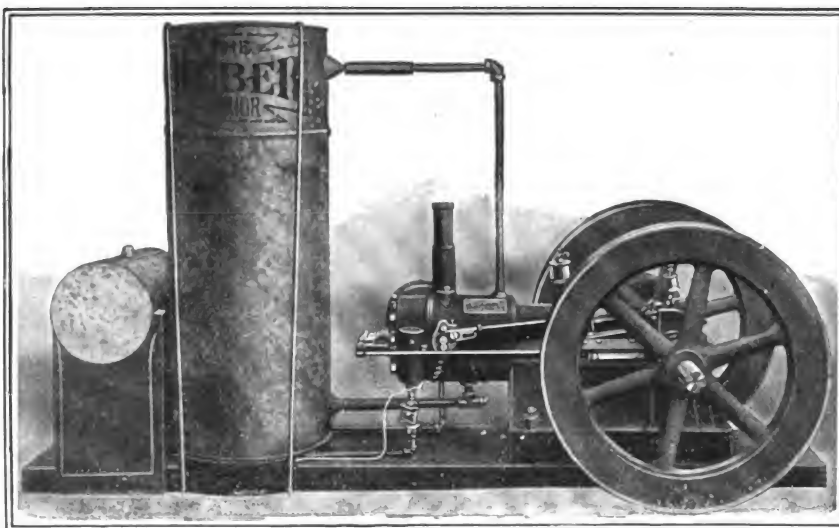
Every one should have a Weber Junior and their labors would be lessened and their trouble would cease.

J. E. ISENBERG.

Branford, Conn.

Gentlemen:—Three and one-half years ago I bought a Weber Jr. engine and have used it continuously in my shop. While I bought it for a 2½ H. P. engine it pulled over a 3 H. P. load when I first got it, and it still pulls 3 H. P. and over. As I have paid out only \$1.00 for repairs, and as the engine pulls as much now as when I first got it, over three years ago, you will see I did the right thing in getting an engine that was built to stay.

JOHN DONNELLY.



Weber Junior 2½ H. P. Engine. It is shipped with all attachments complete, ready to run in short order.

Wilsey, Kansas.
Dear Sirs:—Our Weber, Jr. engine has run our blacksmith shop for the past four seasons and is doing better than ever, with absolutely no expense for repairs.
I. W. PIRTLE & CO.

San Bernardino, Calif.
Dear Sirs:—I have been running one of your Weber Jr. engines for over two years and it has given the very best of satisfaction. The engine runs a hand saw, trip hammer, screw machine, blower, drill and emery wheel, and it will run any three of the above machines at the same time.
C. L. HUNT.

Dowagiac, Mich.
Gentlemen:—Over 2 years ago I bought one of your Weber Jr. engines and have never had occasion to write you since receiving the engine until now. I have given it a thorough test on all kinds of work and it is just as good now as when I bought it, but as I need another supply of hot tubes, I wish you would send me a dozen by mail.
Yours truly,
C. L. DOUGHERTY.

A PENNY POSTAL
WILL BRING ONE OF OUR COMPLETE
AND INTERESTING CATALOGUES. WRITE TODAY.

WEBER GAS AND GASOLINE ENGINE CO.

New York Offices, 115 Liberty St., N. Y. C.

KANSAS CITY, MO.

P. O. Box V. 1114

DON'T BUY GASOLINE ENGINES

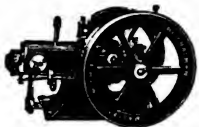
Has a wider sphere of usefulness. Has little or no vibration. Can be placed anywhere without expense for foundation. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

until you have investigated "THE MASTER WORKMAN," a two-cylinder gasoline engine, superior to all one-cylinder engines. Cost less to buy and less to run. Quicker and easier started. Weighs less than one-half the weight of one-cylinder engines. Please give size of engine required. We make 2, 4, 6, 8, 10, 12 and 16 horse-power. Please mention this paper. Send for catalogue.

FORGE PRACTICE, - - \$1.50
TEXT BOOK ON HORSESHOEING, 2.00
AMERICAN STEEL WORKER, - 2.50

EVERY CRAFTSMAN
would do well to have in his shop copies of these books. We can supply them. Do you want to know more about them? Address
AMERICAN BLACKSMITH CO., BUFFALO, N. Y.

ENGINE AND BAND SAW



Blacksmiths and Wheelwrights cannot afford to run a shop without one. Pays for itself the first year. The Chapman is built right and stays right. You had better investigate now.

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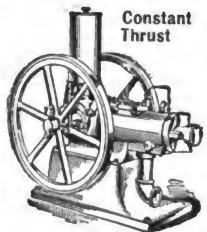
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Armature incased in WATER-PROOF non-corroding brass tube. All brass screws. Friction, Belt or Governor drive. Brush-holders removed without loosening screws. All parts polished brass. Contact and Jump Spark. A TRIAL WILL CONVINCE YOU. Most popular and satisfactory Magneto on the market. Price as popular as Machine.

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The MIETZ & WEISS Oil and Gas Engines



Constant Thrust

STATIONARY and MARINE
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Adopted by the U.S. and Foreign Governments.
Most Economical and Safest Power known. Runs with common kerosene, distillate or fuel oils.

It will pay you to consult me before placing your order elsewhere.

For all Power Purposes. Thousands in use. Highest award for Direct Coupled Engine and Dynamo, Paris Exposition, 1900.

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A. MIETZ, 128-138 Mott St., New York
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of any tools, machines or supplies, such as shown in these columns, let us know and we will have our advertisers send you catalogues and prices. This will save you the trouble of writing a lot of letters. State what you need and when you need it.

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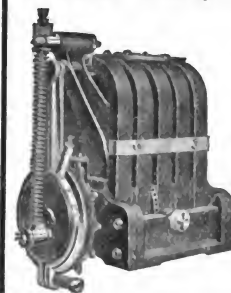
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BUFFALO

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Vertical 2, 3, 4, 5, H. P.
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Catalogue on request.

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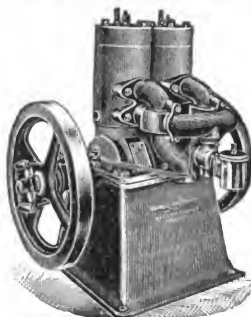


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95 Point Street,
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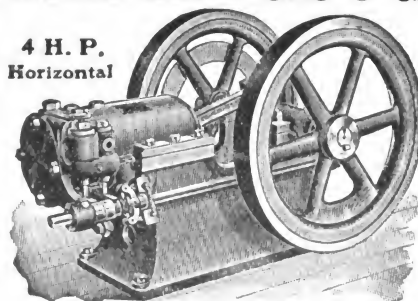
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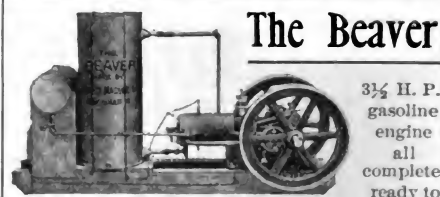
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Horizontal



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
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The Beaver

3½ H. P.
gasoline engine
all complete
ready to

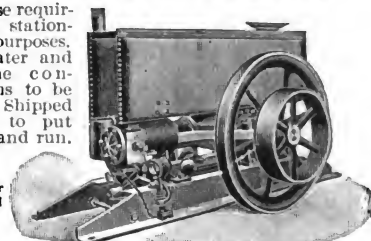
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THE "ABENAQUE" Gas and Gasoline Engines

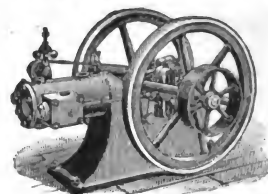
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THE ENGINE THAT MEETS THE DEMAND OF THE DAY

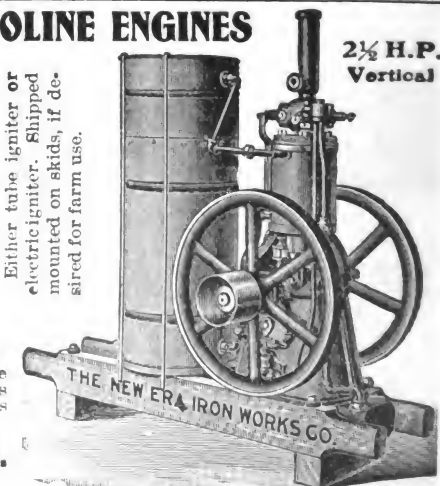


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It has always been our aim to build the best engines possible, regardless of cost, and to so systematize their manufacture that they can be sold at a fair price. All sizes from 2 to 15 H. P.

OUR CATALOG IS AT YOUR SERVICE.

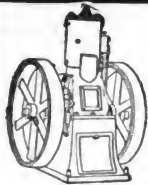
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Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

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THE "FOOL-PROOF" GASOLENE ENGINE

The "ELI" Gasolene Farm Engine is the

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The Acme of Simplicity and Perfection.

If you will examine and compare, piece by piece, you will say there is no other quite so good as the "Bauer." All sizes from 1½ to 20 H.P. Write at once for free catalogue containing long list of letters from satisfied users. Our prices are also very interesting, considering quality.

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Write us Today.

Bauer Machine Works Co.

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IT DOES THE TRICK! R. F. D. SPECIAL.

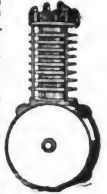


This axle runs easier than any other, and requires no attention. "It's a Wonder." STANDARD BALL AXLE WORKS, Lancaster, Pa.

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We supply the castings, drawings and all accessories. A complete line of rough castings, also finished Motors for Bicycle, Automobile, Marine or Stationary. A 2-cent stamp gets our catalogue.



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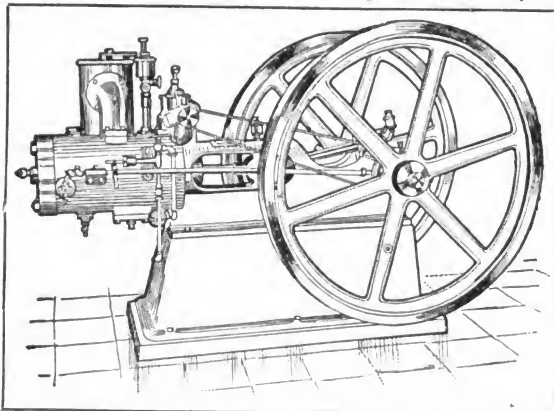
Dempster Gasoline Engines

SIMPLE, DURABLE, SAFE

Two Cycle Type.

Smooth Running, Practically No Vibration.

2
— TO —
30
H. P.



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READY FOR BUSINESS ANY TIME.

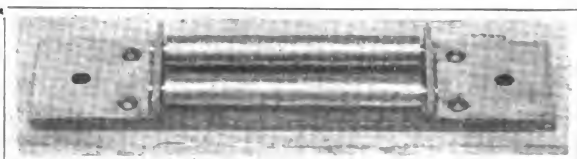
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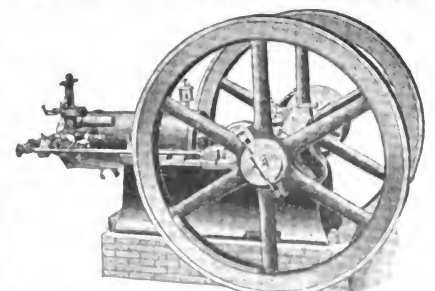
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TRACTION = PORTABLE = STATIONARY



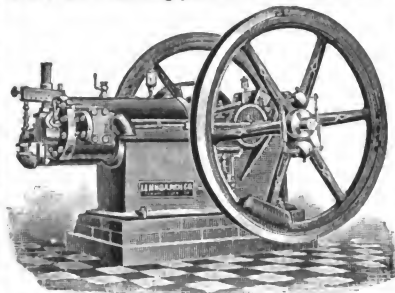
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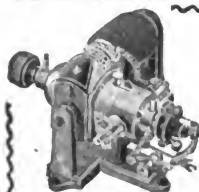
Have more strong points than any others



OUR electric igniter can be cleaned while the engine is running. Other makes cannot be cleaned without stopping and taking the igniter out. Send for catalogue.

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Branch House, 307 3d St., South Minneapolis.



To Gas Engine Operators.
Dynamo Ignition.

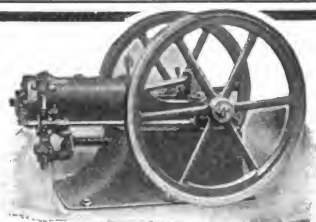
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Auto-Sparker

No battery to start or run. The original speed-controlled friction-drive Dynamo. Driven parallel with engine shaft. No belts. No beveled pulley or beveled fly wheel necessary. For make and break and jump-spark system. Water and dust proof. FULLY GUARANTEED.

We have an attractive proposition for the Dealer in Gas Engine lines. Correspondence solicited.

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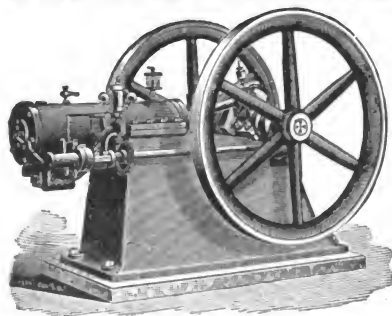
THE ADVANCE ENGINE
FOR PROGRESSIVE SMITHS

No better engine made—a model of perfection, which will stand the most rigid test and be found equal to every shop requirement. Write for our interesting catalogue.

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ARE THE THINGS FOR BLACKSMITHS



Send for Catalogue 33, Stating Horse Power You Need.

COLUMBUS MACHINE COMPANY,
Columbus, Ohio.

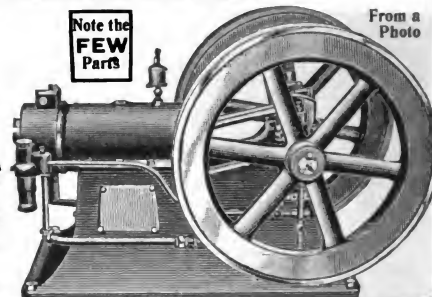
Save Your Back

Let the **McVicker** do the hard, back-breaking work of the shop. It will cost you only 1¢ per horse power per hour when it is working. Isn't your time worth more than that? It will work the bellows, run the drills, operate the trip hammer, and do a thousand and one things that wear out the muscles, and will do it hour after hour without getting tired or requiring attention. Just start it and let it alone—that's all. It has one-third the parts of any other Gasoline Engine—no mystifying cogs, gears, cams, tumbling rods or ratchets to get out of adjustment. The

McVICKER
(Automatic)
GASOLINE ENGINE

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Chicago Office, 804 Dearborn St.



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Parts

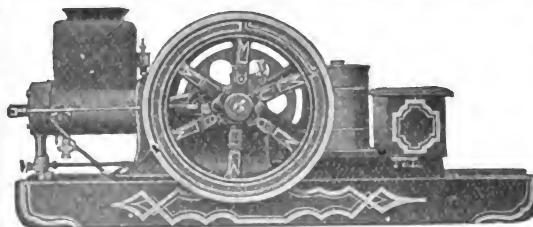
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It's the
SPARK
that
COUNTS



YOUR ENGINE will work better, give you less trouble and carry a bigger load, if you ignite with one of our **Improved Mueller Spark Coils**. Furnished for use with batteries or dynamo. WE GUARANTEE our coils against all imperfections in workmanship and material. If your engine doesn't ignite properly, write us. Information cheerfully given. Correspondence solicited.

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9-10-11 MILLER BLDG. MILWAUKEE, WIS.

The Easy Starting LAUSON

5, 6 and 8 H. P. Special.

THE JOHN LAUSON MFG. CO., NEW HOLSTEIN, WIS., U. S. A.

Is built for zero weather. It has no water tank and pipes to freeze up. Two pails of water is all that is required to keep the engine properly cooled. This feature and our improved generator valve make this an ideal engine for winter work. It will start as easy and work as well at 20 below zero as in summer.

Write for our 1905 catalog describing our line of stationary and portable Gasoline Engines from 2 to 20 H. P. We want Blacksmiths everywhere to act as agents.

OTTO ENGINES**Simplicity is Desirable**

but every engine to work properly must have a governor, air valve, fuel valve, igniter and exhaust valve. The "Otto" has these necessary parts and no more. Further, all these working parts are located at the engine head and on the outside, easy of access for inspection and cleaning—not hidden away behind the fly-wheel and in other inaccessible places. A small point perhaps, but important to the man who takes care of the engine.



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STANDARD OF THE WORLD

Fairbanks-Morse Jack-of-all-Trades

Gasoline Engine will saw more wood than any other 2 H. P. Gasoline Engine.

It is sent all set up and ready to run.

Awarded Gold Medals at World's Fair, 1904

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Engine to run.....

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A Practical, Economical, Money-Making Machine for Blacksmiths. All Heating Done Inside the Shop and Done Quicker and Better Than by any Other Method.

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HENION TIRE HEATER COMPANY
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Which is coming into favor again is here illustrated, the



**Stivers —
Long Swell**

We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

*If you wish further particulars
Write to the*

DALZELL AXLE CO.,
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Ask for LIGHTNING AND GREEN RIVER TOOLS

GREEN RIVER TIRE-BOLT HOLDER

FOR CLAMPING BOLTS
WHILE THE NUTS ARE
BEING TURNED ON OR
OFF.

Fig. 608.



THE LIGHTNING PUNCHING PRESS.

*The best
punch
in the
market
for sizes*

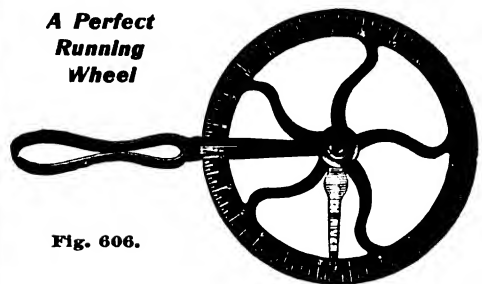
$\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$



TIRE MEASURING WHEEL, GRADUATED

*A Perfect
Running
Wheel*

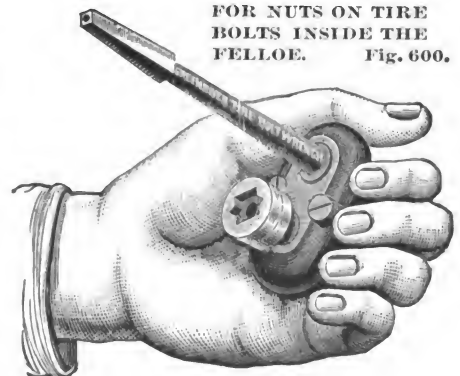
Fig. 606.



PATENT RIM WRENCH

FOR NUTS ON TIRE
BOLTS INSIDE THE
FELLOE.

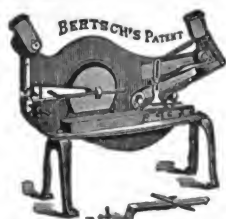
Fig. 600.



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Plates, Taps, Dies, Reamers,
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Low Down Wagons

soon earn their cost on any farm.

Steel Wheels

for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to
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REMINGTON
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first and foremost.

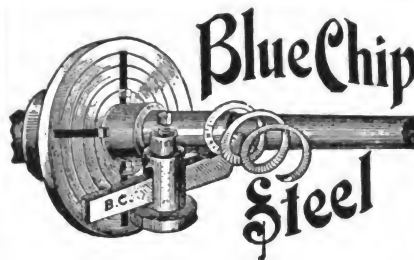
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prices
on
full line
of gears.

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FORSBURG SPRING AND GEAR CO., ROME, N. Y.



Will turn off blue chips
on any kind of work.

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It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



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**NO
LAMENESS
NO
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CHEAPEST
AND
BEST**



Medium
Canvas Back

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Sole Manufacturers **BOSTON, MASS.**



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The Victory Corn and Feed Mills.

**OLDEST AND BEST
GRINDING MILL MADE.**

**STRONG,
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DURABLE.**

Especially adapted to grinding ear corn,
shelled corn, wheat, oats, rye, etc.

WRITE FOR PRICES AND PARTICULARS TODAY.

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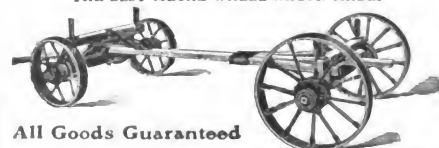
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Handy
Wagon
WITH 4-IN. TIRE STEEL WHEELS
Our wagons are well ironed throughout—wheels made with round staggered spokes.



We make any size wheels to fit any skid.

We maintain a complete line of metal wheels for corn-plan and other uses. Write to
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THE GENEVA
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THE BEST METAL WHEEL WAGON MADE.



All Goods Guaranteed

Pressed steel wheels, any height and width tire, interchangeable hubs. Gears of selected stock, thoroughly ironed. Made in several styles.

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"BRIGHTON" HORSE NAILS

The letter "B" appears on the head of each nail.



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**The EQUAL of ANY Nail except
"NEW STANDARD."****DEALERS' NET PRICES TO SHOERS.**

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Box.....	\$3.25	3.00	2.85	2.75	2.70	2.65	2.65	2.65
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GOOD



MODERN MACHINERY
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Circulars

NATIONAL SELF-OILING STEEL TUBULAR AXLES

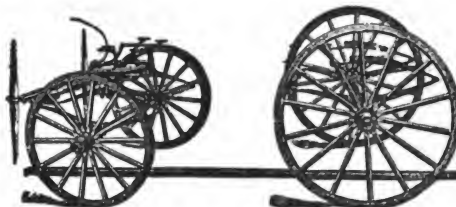
Now made
of high
carbon steel.



Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

National Tubular Axle Co., EMIGSVILLE, PA.**GEARS IN THE WHITE**

Catalogue
A



1,000 Styles
and Sizes

THE AKRON-SELLE CO., Akron, O.**"Union" Combination Self-Feed Rip and Cross-Cut Saw**

(Almost a complete workshop in one machine.)

is suitable for various kinds of work:—ripping (up to 3½" thick), cross-cutting, mitering, etc., and with the addition of extra attachments, rabbeting, grooving, gaining, dadoing, boring, scroll-sawing, edge-moulding, beading, etc.

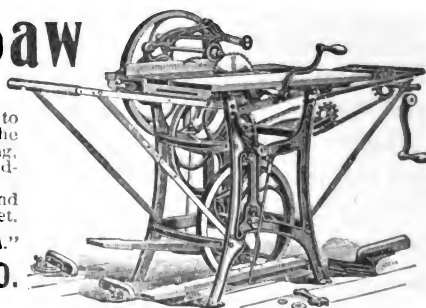
The heaviest, most substantial, accurate and easiest running machine of its kind on the market.

Machines Sent on Trial.

Send for Catalog "A."

THE SENECA FALLS MFG. CO.

274 Water Street, Seneca Falls, N. Y.



(87)

IRON

ANGLES, BARS, PLATES, SHEETS, RIVETS, PIPE,
SHAFTING, ETC.

STEEL

Kept in stock at Cleveland for immediate shipment,
or forwarded direct from mills at lowest market prices.

SEE MONTHLY STOCK LIST.

**THE
BOURNE-FULLER CO.**

**IRON, STEEL
PIG IRON
COKE**

Cleveland, Ohio.

ROOTS'

Acme Hand Blower

For Blacksmiths

It has the unqualified
indorsement of
every mechanic who
has used it.



Durability and High Power

are combined in our new blower as we now offer it to the trade. It is the outcome of our twenty years of experience. Equalled by no other Blower on the market. Absolutely every weak point has been eliminated in this new machine.

Any smith can now renew the bronze bearings in the new Blower in a very few minutes.

Net price with box and connecting pipe for tuyere

\$15.50

Ask your hardware merchant for particulars. Be up to date and use a Roots Acme Blower. Others come and go with new designs, but we perfect what has always been
The Leader of Blowers for Blacksmiths.

P. H. & F. M. ROOTS CO.

New York Office:
120-122 Liberty Street

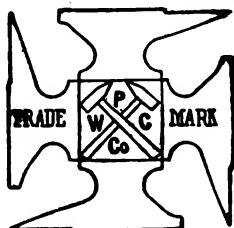
Connersville, Indiana

Chicago Office:
1547 Marquette Building

YOU WILL NEVER FAIL

*To Make a Strong, Clean Weld If You
Use Perfection Welding Compound.*

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

PRICE CONSISTENT WITH QUALITY.

PERFECTION WELDING COMPOUND CO., SCRANTON, PA.



The
**Blacksmith's
Friends**



Patented May 10, 1904.

BANNER WELDING COMPOUNDS

Welds at a low heat, does not fly. Saves time and fuel. **Guaranteed** to weld iron to steel, or malleable iron to steel, or iron and steel to steel.

Pass all arguments on other brands of welding compound until you have tried the **Banner Brands**.

Ask Your Supply House for the famous 3 A Banner Welding Compound for general welding, and the famous Banner Toe-Calk Welding Compound for fine, smooth, solid Toe-Calk welding.

We will send a large free sample to any regular blacksmith
CORTLAND SPECIALTY CO., Sole Manufacturers, Cortland, N. Y.

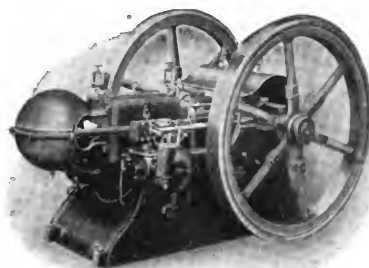
NORTH PLATTE, NEB.,
May 25th, 1905.

BUFFALO FORGE CO.
Buffalo, N. Y.

Gentlemen:—

We find that your No. 200 Hand Blower is just what you say it is. We are satisfied that it gives more wind than any Blower in the city. We have a larger fire than any blacksmith in town. We do heavy forging and from the blast those fellows get, I know their Blower would not do our work, as we have wind to spare.

Yours truly,
WM. GAUNT & SON.

LIGHTNING BALANCED

GAS and  **GASOLINE ENGINES**

**Are Especially
Suited for
Blacksmith Shop
Power.**

Write for Free Catalogue.

KANSAS CITY HAY PRESS CO.,
482 Mill Street, - - - KANSAS CITY, MO.

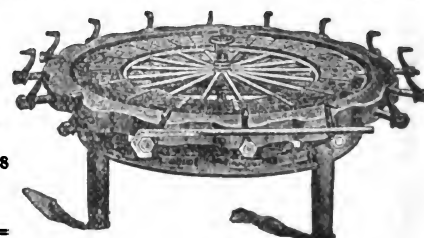
INVESTIGATE**The Hercules Hydraulic**

**Before
You
Buy a
Tire Setter**

National Machine Co.
KEOKUK, IA.

Henderson Hand Power **TIRE SETTERS**

Set Tires Cold.
Keep the Dish right
Tighten Wood Work
Pull Broken Spokes
Jump In New Spokes
Are Money Makers



Standard Tire Setter Co.
KEOKUK, IA.

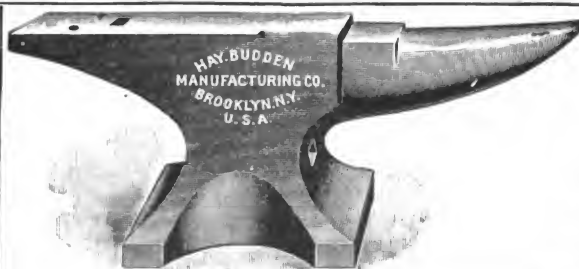
HAY-BUDDEN SOLID WROUGHT ANVILS

**The Gold Medal Anvil
Highest Award**

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best American Wrought Iron and faced with best Crucible Cast Steel. Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 90,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

VOLUME 4

THE

NUMBER 12

AMERICAN BLACKSMITH

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

SEPTEMBER, 1905

\$1.00 A YEAR
10¢ A COPY



O. B. BANNISTER, President
MUNCIE WHEEL AND JOBBING CO.
MUNCIE, IND.

Manufacturers of The Bannister Wheel.

The best dodged spoke wheel on earth.

The rims will not split. The spokes cannot get loose in hubs.

CARRIAGE MAKER and BLACKSMITH TOOLS

THE "ELITE" BLOWER

is correctly manufactured
and is designed to
meet the demands of
hard service, together
with the greatest
possible efficiency,
durability
and convenience.

IT'S A
MONEY
MAKER.



Fig. 900, 12 inch.

Manufactured by

THE
SILVER MFG. CO.
365 BROADWAY
SALEM, OHIO
U. S. A.

Hub Boxing Machines, Spoke Tenon Machines, Band Saws, sizes 20, 26, 32 and 36 inch, Forges, and a complete line of hand and light Power Drills, a 19-inch Post Drill and a 20-inch Round or Square Base Drill with Lever or Screw Feed. The last two drills are used extensively by Carriage Builders and others.

THESE ARTICLES
ARE
GUARANTEED
AS
REPRESENTED.

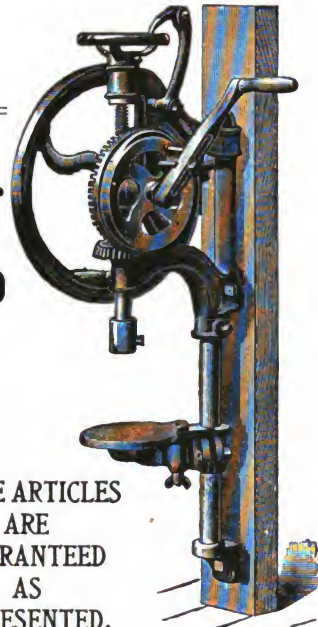


Fig. 731, No. 1.



Fig. 742, No. 12.

Special prices are extended to Carriage Makers and Smiths
if this paper is mentioned.



Fig. 850, 20 inch.

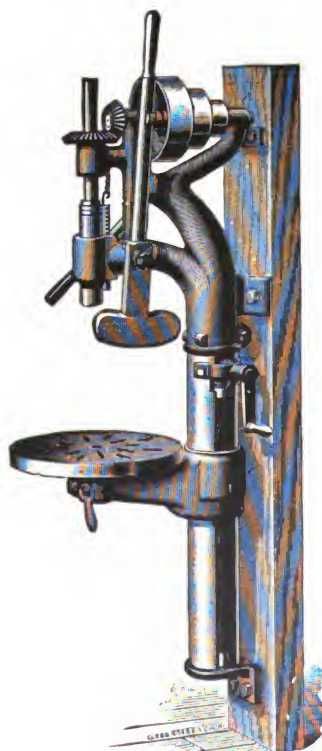


Fig. 727, 19 inch.

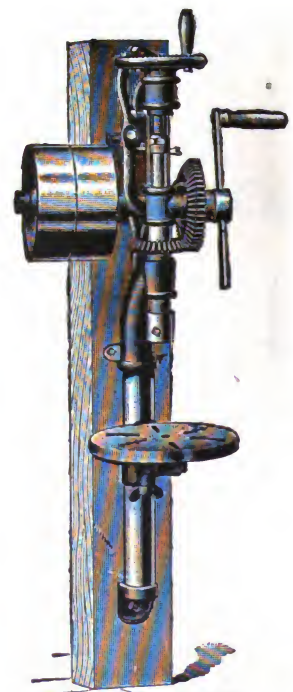


Fig. 746, No. 12.

RAY CRAY BROS. RAY

BARGAIN BULLETIN

We conduct a strictly MAIL ORDER BUSINESS. Employ no traveling salesmen, and give our customers the benefit of these savings in the superior quality and low prices of our goods. We sell the Blacksmith direct through a complete catalogue, and can save you money in all lines. Our stock is complete in all Departments. Goods shipped on same day order is received. Give us a trial order and be convinced. CATALOGUE SENT FREE

SEPTEMBER SPECIALTIES

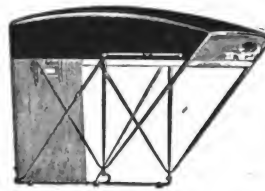


WOOD HUB WHEELS.

Made to order in our own factory. Quality guaranteed and prices right. Let us quote you our best wholesale price when looking for wheels. We can save you money, we are satisfying customers in all parts of the country. Take advantage of our well assorted line. Secure prompt shipment and best services. Send us your orders.

We are Sales Agents for
Whalebone Wheels
and are prepared to fill your requirements upon short notice.

A Complete Line of Tops and Trimmings.



most skilled labor, and are offering to the trade the Finest Assortment of Tops and Trimmings on the Market.

Let us send you samples. We manufacture the finest Buggy Tops, Backs, Cushions, Sun Shades, and everything in Seat Trimmings. Our No. 6 Top and No. 18 Stick Seat shown here are leaders. Our shop is equipped with all modern improvements. We employ the

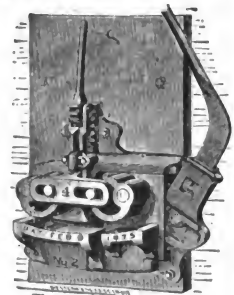


STODDARD'S TIRE UPSETTER.

- | | | |
|--------|--------------------------------------|--------|
| No. 1, | Having capacity for 2 inch tire..... | \$4.12 |
| No. 2, | Having capacity for 4 inch tire..... | 6.99 |
| No. 3, | For 4 inch tires and axles..... | 9.90 |

Special prices on a limited number of handy and reliable upsetters. Will not kink the tire and easily operated by one man.

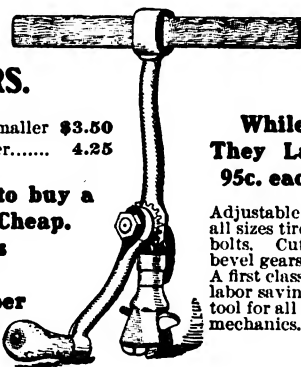
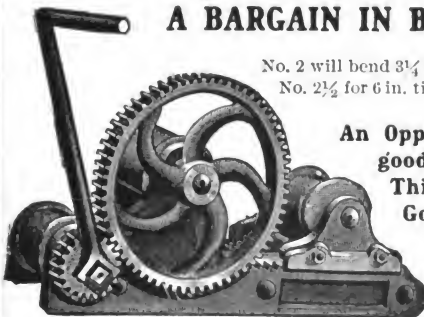
Don't wait till they are all gone. Order today.



A BARGAIN IN BENDERS.

- | | |
|--|--------|
| No. 2 will bend 3 1/4 in. tires or smaller | \$3.50 |
| No. 2 1/2 for 6 in. tires or smaller..... | 4.25 |

An Opportunity to buy a good Bender Cheap.
This Offer is Good for September only.



While They Last, 95c. each.

Adjustable to all sizes tire bolts. Cut bevel gears. A first class labor saving tool for all mechanics.

TIRE BOLTS AT COST.



1 3/4 x 7.....\$1.25 per box of 1000.

This is the best size for general use and the one that sells most extensively. Better get in a good supply at this price. The price for any less quantity than 1000 found in catalogue. This applies only to this particular size and quantity.

JUST OUT, OUR FALL NET PRICE CATALOGUE with REDUCED PRICES on all supplies advertised in this paper. It is **free** to the trade only. A postal will bring it. Write for catalogue today and mention THE AMERICAN BLACKSMITH.

SPECIAL SALE OF AXLES.



	NO. 12 SHORT BED, price	NO. 11 LONG BED, SQUARE AND FAN TAIL, \$1.38 per set.
7/8 x 6 1/2	\$1.13	1.38
1 1/8 x 6 1/2	1.13	1.38
1 1/4 x 6 1/2	1.25	1.50
1 1/2 x 6 1/2	1.44	1.75
1 3/4 x 7	1.44	1.75
1 1/2 x 7	1.75	2.13
1 3/4 x 7 1/2	1.75	2.13

This offer has never been excelled in quality or price. We have purchased a large quantity of the above sizes and for the month of September offer these axles to the trade at these exceptionally low prices. This is a rare opportunity, you can always use axles and cannot duplicate these prices elsewhere. Orders promptly filled.

CRAY BROTHERS, Cleveland, O.

53-55 WATER STREET.

DEPARTMENT B.



The above is a small facsimile of a Show Card, 17" x 25", printed in colors, which we will send to any part of the world, postage paid, upon receipt of request.

THE CAPEWELL HORSE NAIL COMPANY

HARTFORD, CONN., U. S. A.

BRANCHES

NEW YORK: 103 BEEKMAN ST.
 PHILADELPHIA: 323 ARCH ST.
 BALTIMORE: 326 NORTH GAY ST.
 BUFFALO: 11 ELLICOTT ST.
 CHICAGO: 238-240 RANDOLPH ST.
 CINCINNATI: 720 MAIN ST.
 DETROIT: 29-31 FARRAR ST.

NEW ORLEANS: 736 UNION ST.
 ST. LOUIS: 12-14 NORTH 12TH ST.
 DENVER: 1520 20TH ST.
 SAN FRANCISCO: 636 MISSION ST.
 PORTLAND: 554 WORCESTER BLOCK.
 MEXICO CITY: Apartado 2377.
 TORONTO, CAN.: 54 Duke St.

Get Ready for Fall Trade
and Buy a Stock of

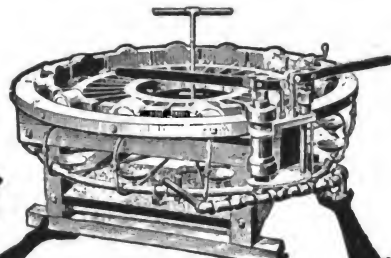


STAR PLOW SHARES

THEY ARE RIGHT.

All qualities and sizes and every one
guaranteed. For sale by jobbers
everywhere.

Star Manufacturing Co.,
CARPENTERSVILLE, ILL.



OF COURSE this is an impossible picture, but it will serve to call attention to the West Tire Setter, a tire setting machine that does all the work of setting a tire better than it can be done any other way, and in one minute, as against an hour by the old way. Every manufacturer of vehicles or wheels and every repair man and blacksmith should have one. Saves its cost and shows a handsome profit in a very short time.

WRITE FOR CATALOG.

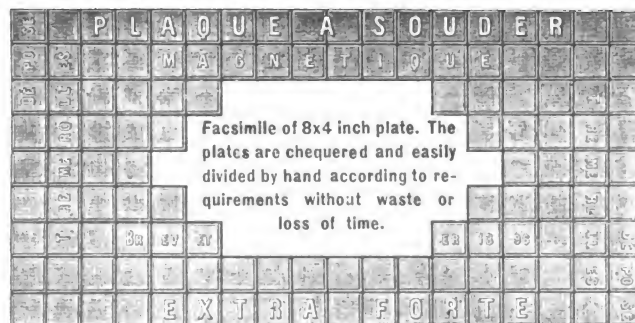
The West Tire Setter Co.
Rochester, N.Y.

HAVE YOU TRIED

LAFFITTE WELDING PLATES

If not, send for samples at once as you are losing time and opportunity. They are different from anything you have ever seen or tried, and the results are simply remarkable.

Chemically Welds
at a
Low Temperature
Saving 33 Per Cent.
In Time and
Fuel.



Facsimile of 8x4 inch plate. The plates are chequered and easily divided by hand according to requirements without waste or loss of time.

Welds Iron and
Steel of all Kinds,
Including
Crucible Steel,
Steel and
Malleable Castings.

Produces a perfect weld and an absolutely homogeneous joint. In use by railways and government works all over the world. If your dealer does not carry them, send us \$1.00 and we will send you six (6) full sized plates as a trial order, all charges prepaid.

F. R. PHILLIPS & SONS CO.

PENNA. BUILDING

Sole American Agents

PHILADELPHIA, PA.

THREE GOOD THINGS

"ASK THE DEALER."



The
ROYAL
WESTERN CHIEF
BLOWER

IS A
GOOD
Blower

ROYAL BLOWER

Crank turns right or left.
Its operation is easy and noiseless.
Blast is powerful. After-blast lasting.
Gears and Boxes are phosphor bronze and steel.
No spiral or worm gears.
Fan, 12 inches. Weight 100 lbs.
Fire-pot measures 9x11½x4 in. inside.

No. 14 DRILL.

This Drill has set the pace for all.
It simply does everything itself.
Seems to have brains.



THE
WESTERN CHIEF
DRILL
No. 14

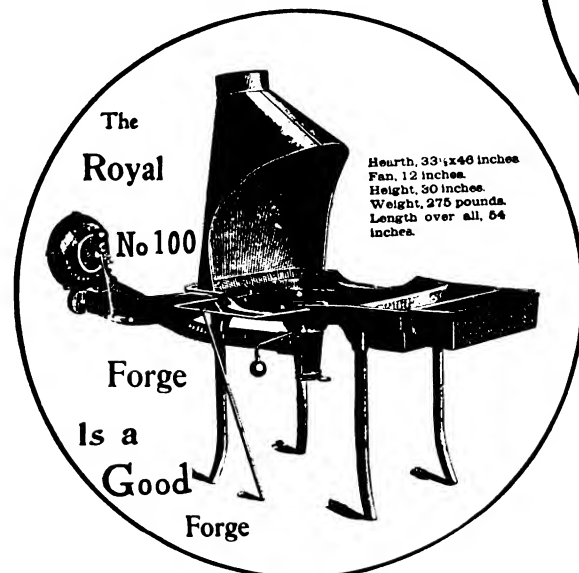
Is a Good Drill

Drills to center of 21-inch Circle.
Bores from 0 to 1½ inches.
Takes Bits ½ or ¾ Shank.

Weight, 315 pounds.

It has independent quick return by means of which the operator can rapidly withdraw the bit at will, without stopping or reversing motion of machine. Or it can be set to drill any depth desired and will automatically (whether running by power or hand) reverse itself, withdraw the bit, and start drilling again and again indefinitely; all without stopping the motion of machine, or turning it backward. This feature is independent of Drill, and need not be used unless desired.

It has mechanical device for raising and lowering the table.



The
Royal
No 100
Forge
Is a
Good
Forge

Hearth, 33½x46 inches
Fan, 12 inches.
Height, 30 inches.
Weight, 275 pounds.
Length over all, 64 inches.

No. 100 ROYAL FORGE—An all-around Forge for the lightest and heaviest work.

We have about one hundred other "GOOD THINGS" in the way of Forges, Blowers and Drills for you to select from.

CANEDY-OTTO MFG. CO.

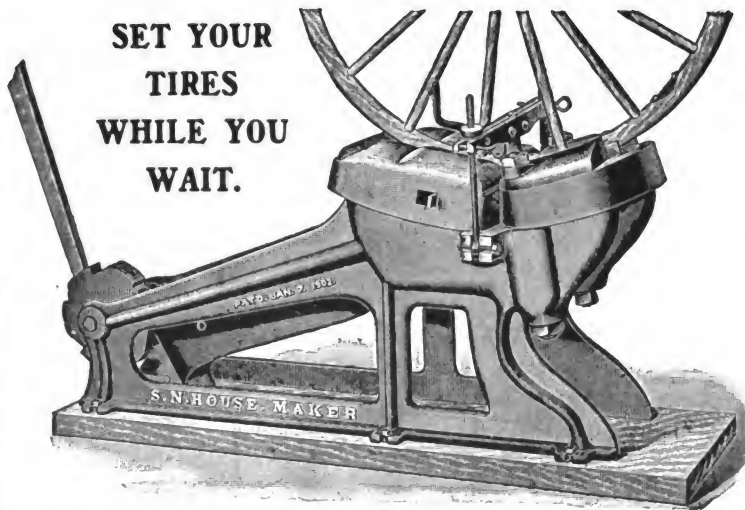
CHICAGO HEIGHTS, ILL.

JONES WHEELS
- BEST -
ON EARTH

PHINEAS JONES & CO.

OF NEWARK, N. J.

SET YOUR
TIRES
WHILE YOU
WAIT.



THE HOUSE COLD TIRE SETTER

Nearly 2,000 in successful use and all of them placed in the last three years. This demonstrates the fact that a **Successful Cold Tire Setter** has been made after twenty years' hard work and after fifteen patents have been issued to other inventors which we must admit have comparatively all failed; but don't let that discourage you. The first locomotive, sewing-machine, and harvester were failures, but are a success now and so is our machine. It is simple and works on the principle of the hot tire shrinker, and it can't be broken, and you can't make a mistake in buying it. Write us for catalogue and prices.

This cut shows that when the keys grip the tire in each head, and the heads are brought together, that they move with the circle of the wheel, and pull the tire from both ways round the wheel, tightening it nicely, and cannot kink the tire nor injure the felloe; but simply shrink the tire cold in a short space between the two heads just as the hot shrinker has always done.



TUSKEGEE, ALA., Jan. 6, 1905.
DEAR SIR—I consider your Cold Tire Setter the finest machine and the best friend that a blacksmith ever had. It is simple and durable, and its power is unknown, and it is a trade drawer. I would not be without it for anything. From the 10th of June to the 31st of October, I set 750 tires. Success to you. Yours truly,
W. M. MORRIS & SON.

THE HOUSE COLD TIRE SETTER CO.

Office and Factory, 216 to 220 South Third St.,

ST. LOUIS, MO.

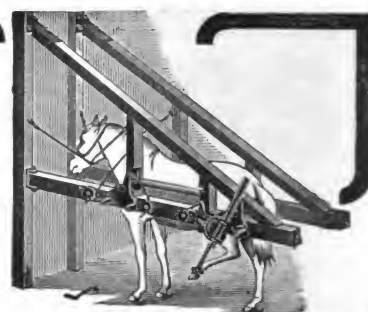


BARCUS HORSE STOCKS

GIVE PERFECT SATISFACTION.

MR. GEO. BARCUS:

Marblehead, Mass., July 24, 1905.
DEAR SIR—Before purchasing one of your stocks I wrote to a number of shoers about them, and they all advised me to buy one, and I must say that I have been well repaid. I have had horses come to me as far as 15 miles away, and this week I am going to have one come from Gloucester, and he has not had a shoe on his hind feet for four months. There isn't the least chance to get hurt, for your stock is so easy to operate that neither man nor horse can get hurt. The horseshoer will never know what it is until he has one in his shop. J. F. RYAN.



Our Horse Stocks please everybody, because they are simple, reliable and durable. All the objectionable features of the cheap stock have been eliminated. No block and tackle with ropes to get tangled and broken. No bracing to floor or roof. Will not skin or chafe the foot. **Not the Cheapest, but the Best.**

WRITE FOR PARTICULARS.

Geo. Barcus & Company

Box 61. Wabash, Ind., U. S. A.

CANADIAN HORSE STOCK CO., Hamilton, Ontario, Canada.

AN AXLE

Which is coming into favor again is here illustrated, the



**Stivers—
Long Swell**

We make it of either iron or steel, fitted with wrought or cast box, and a variety of nuts.

If you wish further particulars
Write to the

DALZELL AXLE CO.,

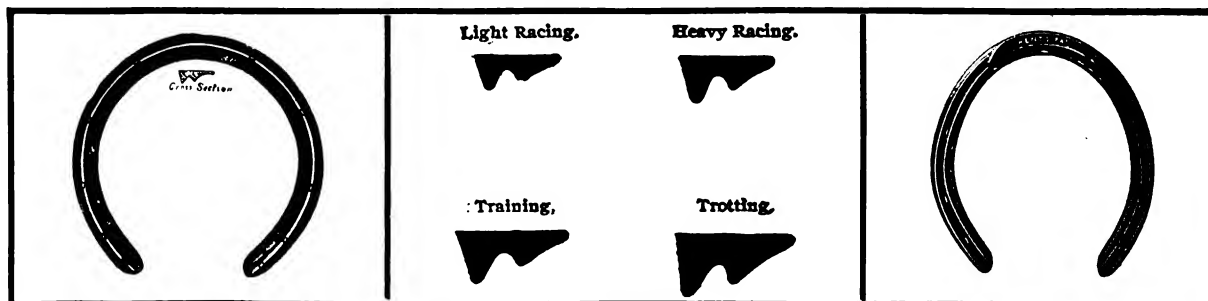
South Egremont, Mass.

RACING SEASON SPECIALTIES

IF YOU SHOE TROTTERS, PACERS OR RUNNERS, you will be interested in knowing where to obtain the best materials for this purpose.

B. & M. PATENT RIBBED STEEL, the COVINGTON & KENT STEEL, and the COVINGTON & KENT BOSS RACING PLATES will save you lots of time and worry.

STEEL THE BEST. SHAPES THE MOST APPROVED.



Catalogue and Price List on Application

BRYDEN HORSE SHOE CO.

MANUFACTURERS

CATASAUQUA, PA.

Mention THE AMERICAN BLACKSMITH

RUBBER RUNABOUT, \$35.00
TIED TOP BUGGY, \$27.50
BUGGY TOPS, \$4.50
 Write for 100-page Catalogue. It's free. Compare Our Prices.
BUOB & SCHEU, 1883 ESTAB 500-520 EAST COURT ST. CINCINNATI, OHIO

SEND FOR BAUER'S
RED BOOK

and Price List on

Tops and Trimmings
 Tops, \$4.50 and up.

BAUER BROS. MFG. CO.

937-939-941 W. 8th St.
 CINCINNATI, O.



PATENTS PROTECT YOUR IDEAS

No Patent, No Fee. Consultation Free.
 Established 1864.

MILO B. STEVENS & CO.,
 852 14th St., Washington.



THE BLACKSMITH'S FRIEND

With the aid of this tire setter any one can set tires of any kind satisfactorily. Strongly built, easy to operate, a new, practical device for up-to-date shops. Write for prices.

GEO. W. TINKEY, PLYMOUTH, O.



Lathes and Drill Presses

Especially for Blacksmiths and Machinists, also Hand and Power Planers and Shapers and Machinists' Supplies.

Catalogue M.

SHEPARD LATHE CO., 132 W. 2d St., Cincinnati, O.

High Pressure Brand No. 2 Brazing Forge



Patented February 7, 1900.

Will do all kinds of brazing, both light and heavy. It is fitted with three powerful improved Hydro-Carbon Burners. Both Gasoline and Kerosene Machines in stock. Write for description.

The National Cement and Rubber Mfg. Co.,
 3051 Monroe Street. TOLEDO, OHIO. U. S. A.

PORTER'S
 THE BEST
BOLT CLIPPERS

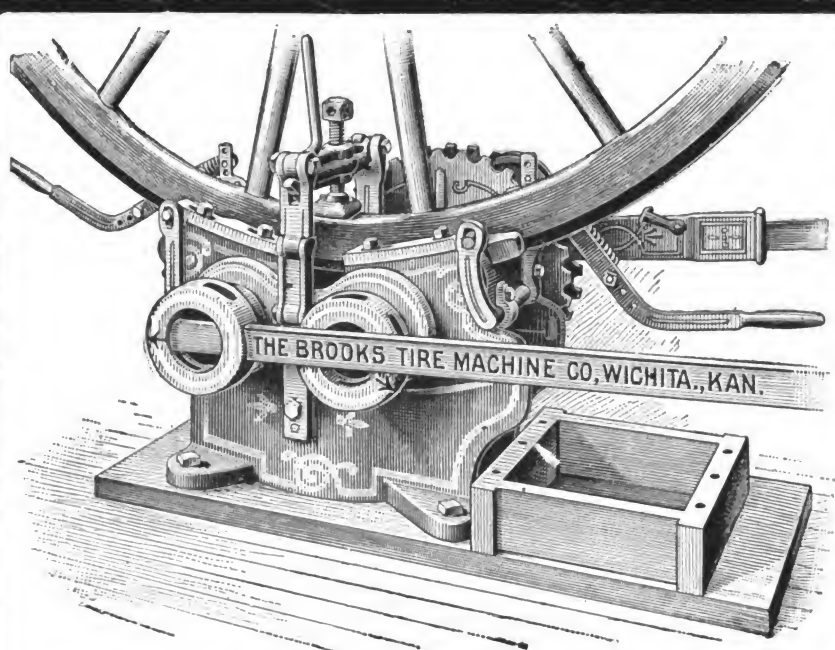
H. K. PORTER, Sole Manufacturer
 EVERETT, MASS.



"Easy" for 3-8 and 1-2-inch Bolts

This Cut Shows No. 2
 NEW EASY for 1-2-inch Bolts
 My Latest Tool.

"New Easy" for 5-16, 3-8, 1-2 and 5-8-inch Bolts



THE BROOKS COLD TIRE SETTER

A machine for upsetting tires cold while on the wheels. It gives just the amount of dish or tension to the wheel required without checking or splitting the felloe at the spoke tenons. It eliminates all chances of injuring the wheels. It is unnecessary to remove the tire or bolts from the wheel to upset the tire. It does accurate and rapid work. It is durable and simple in construction.

The BROOKS' reputation was long established and a big demand created for it before any other edge grip machine now on the market was built. The necessary construction of

A Successful Edge Grip Machine

is protected by our patents which other builders cannot use without infringing. The great success of the BROOKS has caused the United States Government to adopt cold tire setting, and the BROOKS is the only edge grip machine used in the Government shops. Why? Because on thorough investigation the Government departments found it to be the best. It is manufactured by the longest established and most experienced builders of edge grip cold tire setters in the United States. Think it over and write us. DO IT NOW. We want to send you our printed matter.

THE BROOKS TIRE MACHINE CO.

121 N. Water Street, Wichita, Kan., U. S. A.

**HAND
 FORGED**



**BUTCHER
 KNIVES**

**A GOOD
 SIDE-LINE**

Hundreds of blacksmiths are making large profits by selling these blades. Each one is fully warranted. Made of Sanderson Steel.

Round or riveted. All sizes from 5 to 8 inch.
 Handles ready to put on, 1c each.

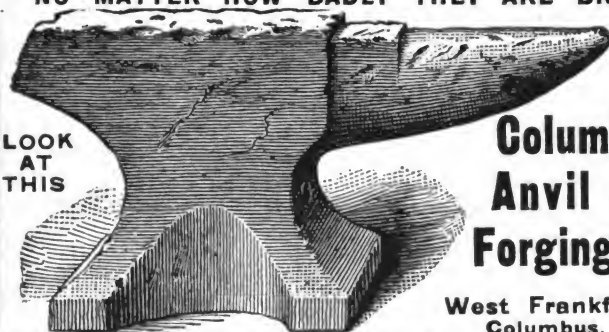
**\$.15 EACH
 \$ 1.50 DOZ.**

Hand Forged Razors, ready to use, 40 cents each.
 Pocket Knife Handles in variety, 10 cents each. Send for sample.

WOODWORTH KNIFE WORKS, NUNDA, NEW YORK

NO MATTER HOW BADLY THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE.

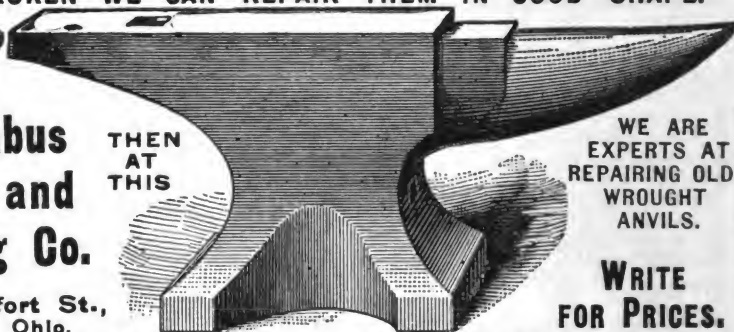
LOOK
AT
THIS



**Columbus
Anvil and
Forging Co.**

West Frankfort St.,
Columbus, Ohio.

THEN
AT
THIS



WE ARE
EXPERTS AT
REPAIRING OLD
WROUGHT
ANVILS.

WRITE
FOR PRICES.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL.

ASK YOUR DEALER FOR THEM.

HONEST DEALINGS

Before an advertisement is accepted for this journal, careful inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interest will be protected. As a constant example of our good faith in AMERICAN BLACKSMITH advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

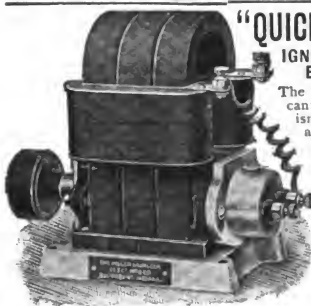
VICTORIA
BOWS,
OVAL TOP
EXPRESS,
FLAT TOP
EXPRESS,
BUGGY BOWS

Some of the Bows we make. Write for catalogue describing our full line.



S. N.
BROWN & CO.

DAYTON, O.



"QUICK ACTION"

IGNITING DYNAMOS
Excel All Others!

The only generator that cannot lose its magnetism. For either make and break, or jump spark work. Also spark coils. Send for Catalogue B.

The
Knoblock-
Heideman
Mfg. Co.,
SOUTH BEND,
IND.

Locations for Industries

*Erie Railroad System
New York to Chicago*

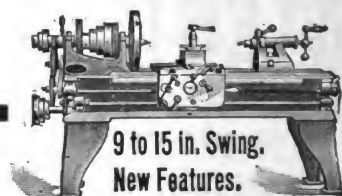
The Erie Railroad System's Industrial Department has all the territory traversed by the railroad districted in relation to resources; markets and advantages for manufacturing, and can advise with manufacturers of specific products as to suitable locations, furnishing them with current information of a comprehensive nature, dealing with the project in its full relation to manufacture and commerce.

Address

LUIS JACKSON

Industrial Commissioner, Erie Railroad Company

21 Cortlandt Street, New York



9 to 15 in. Swing.
New Features.

SEBASTIAN LATHES are Good Lathes
Catalogue Free. Sizes 9, 10, 13, 15 Inches.

Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each lathe. Foot lathes, Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert Street, CINCINNATI, OHIO.



The Ideal Steel Center Toe Calk
Write for Circular and Prices.

THE WEYBURN COMPANY
Rockford, Illinois.

Style No. 0,
Cyclone
Portable
Forge.



Our Free
Catalogue
illustrates
more than 20
other styles

Easy
Running.
Powerful.
Large
Capacity.

CYCLONE PORTABLE FORGE

The Cyclone Portable Forge, shown here, is a favorite everywhere. Suitable for heavy, as well as light work. Has a 28x40 in. hearth, large capacity coal box and a 14 in. fan. The deep firebox and powerful blast make the Cyclone Style No. 0 capable of doing the heaviest kind of work. The Cyclone has double Ratchet, Adjustable Legs, Solid Frame, Detachable Lever hung on Ball Joint and swinging in chilled seat. FULLY GUARANTEED.

Write today for our FREE Catalogue and SPECIAL INTRODUCTORY PRICES.

FOOS MANUFACTURING CO.,
28 Sheridan Ave. SPRINGFIELD, OHIO.

FOOT, HAND AND LIGHT POWER

WOOD-WORKING MACHINERY

For Carpenters, Wagon Builders, Cabinet Makers
and Wood Workers Generally.

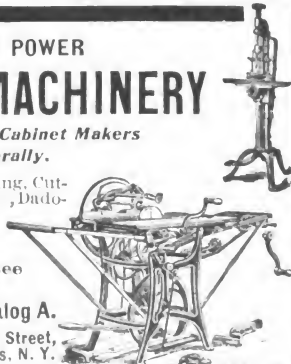
Machines for Scroll and Band Sawing, Ripping, Cutting Off, Mitering, Rabbing, Grooving, Gaining, Dadoing, Beading, Edging Up, Boring, Mortising, Tenoning, Turning, Etc.

For Working Wood in any manner.

Enterprising Mechanics are quick to see the Superior Merit of our Machines.

Machines Sent on Trial. Send for Catalog A.

The Seneca Falls Mfg. Co., 274 Water Street, Seneca Falls, N. Y.



TOOLS

FOR THE
HORSESHOER
AND

BLACKSMITH
IS OUR SPECIALTY



New Rounding Hammer.

FREE—a catalogue and hanger giving a table which will enable you to cut horseshoe moulds to any weight without waste.

Champion Tool Co.

Meadville, Pa.

THE JOSEPH F. MCCOY COMPANY, 157 Chambers St., New York City. Eastern Selling Agents.

TRADE MARK



Our Trade Mark

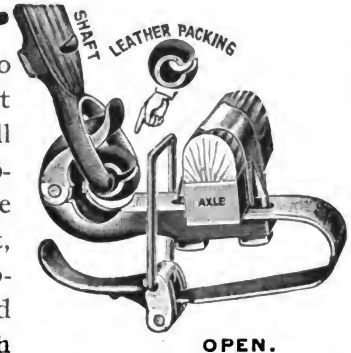
Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.

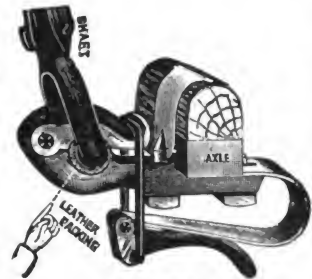
A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,
Syracuse, New York.



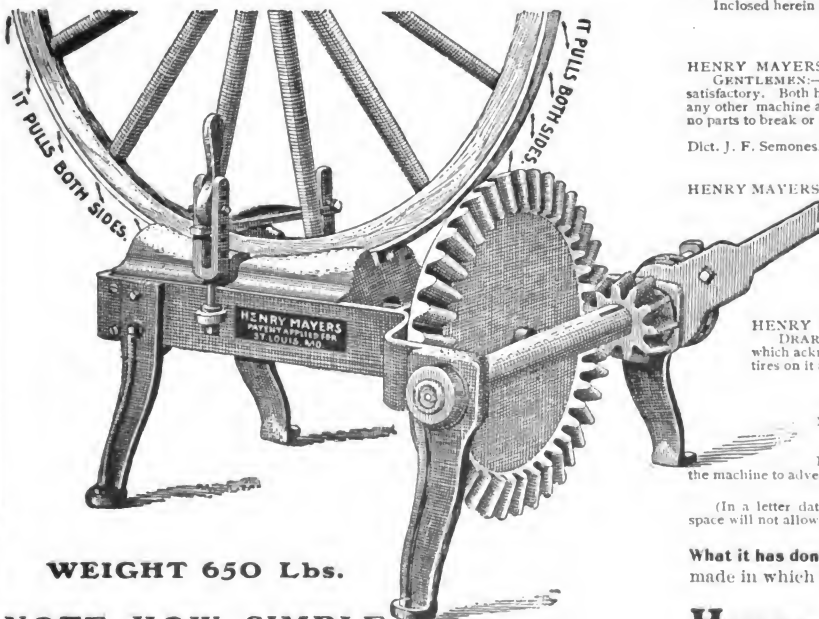
OPEN.



CLOSED.

MAYERS COLD TIRE SETTER

FULLY WARRANTED, EVERY OUNCE STEEL.



WEIGHT 650 Lbs.

NOTE HOW SIMPLE
and POWERFUL.

WE LET OTHERS DO THE TALKING.

PELAHATCHIE, MISS., July 10, 1905.
HENRY MAYERS MACHINERY CO., St. Louis, Mo.
DEAR SIR:—The Cold Tire Setter I recently bought of Mr. D. M. Mayers was received last Friday. All in good shape and I tested its work Saturday evening on a wheel that was badly gone back, or dished back the wrong way; and the owner of it had put a strip of wood under it 1-4 of an inch thick, which I had taken out and then put the wheel in the machine and forced the dish back to its proper shape and pulled the tire back tight on the wheel; taking up at least one inch in the tire by shifting it and pulling it at three different places. The machine works entirely to my satisfaction; it pulls the tire both ways, giving the operator a chance to tighten the loose spokes in the hub. And as there is no part to break it will last a man a life time and then be good for his children after him.
Inclosed herein please find settlement in full for machine.
Most respectfully,
D. J. LESSEL.

UNION CITY, TENN., Aug. 8, 1905.
HENRY MAYERS MACHINERY CO., St. Louis, Mo.
GENTLEMEN:—We have given your cold tire setter a severe test and find it entirely satisfactory. Both heads coming together at the same time gives it a great advantage over any other machine and insures perfect work. Being steel it can not be broken and it has no parts to break or wear out. Wishing you much success, we beg to remain,
Yours very truly,
SEMONES & SON.

RIVES, TENN., Aug. 18, 1905.
HENRY MAYERS MACHINERY CO., St. Louis, Mo.
DEAR SIR:—Inclosed please find notes signed and returned for which acknowledge receipt and oblige. The machine is O. K. Haven't set but few tires. It has rained so much. But I have done 5 dished back wheels and it worked like a charm. I have seen several other machines and I think this the best as I pull my tires from both sides in the place of all from one side.
Yours truly,
H. L. CROWELL.

PEARL, ILL., Aug. 1, 1905.
HENRY MAYERS MACHINERY CO., St. Louis, Mo.
DEAR SIR:—Inclosed please find notes signed and returned, also \$5.00, for which acknowledge receipt and oblige. The machine is all O. K. I have set 40 tires on it and will say it does the work to perfection.
J. W. CLONINGER.

COOPER, TEX., July 31, 1905.
MESS. HENRY MAYERS MACHINERY CO., St. Louis, Mo.
GENTS:—The machine reached here in safety and it is a beauty. Inclosed you will find notes for same. Also please send me the cut of the machine to advertise with.
Yours truly,
T. C. ANDERSON.

(In a letter dated Aug. 15th he says, "Your machine did perfect work.")—Lack of space will not allow more LETTERS.

What it has done for Them, it will do for You.—The only Cold Tire Setter made in which Both Heads come together at same time. Easy terms.

Henry Mayers Machinery Co.

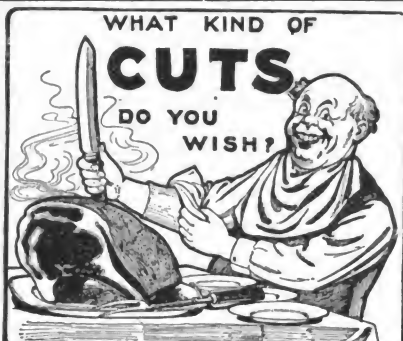
300 South First Street, ST. LOUIS, MO.

METAL SHINGLE ROOFING . .



With Montross Telescope Side-Locks is the best roofing in the world for house or barn. Storm proof. Easily applied. Catalogue, Prices and Testimonials free for the asking.

Montross Metal Shingle Co., Camden, N. J.

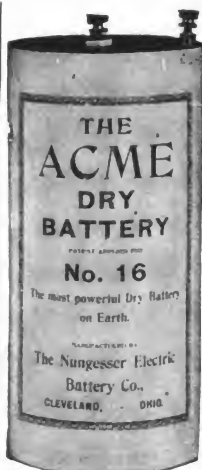


CUTS for Circulars, showing exactly what is needed.
CUTS for Booklets, making the matter plain and interesting.
CUTS for Catalogs, illustrating the article clearly.
CUTS for Street Car Cards, attractive and attention-compelling.
CUTS for any purpose, and all of the highest quality.

Three-Color Half-Tones a specialty.

ASK TO SEE SAMPLES OF OUR WORK.

BUFFALO ENGRAVING COMPANY,
 Cor. S. Division and Ellicott Sts.
 BUFFALO, N. Y.



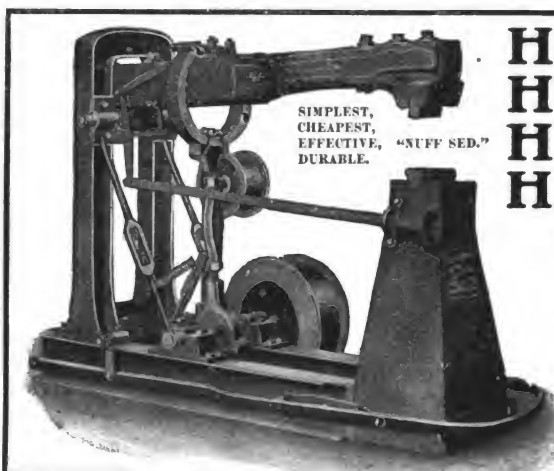
Don't Hesitate—Just Buy The No. 16 Acme

Absolutely the most reliable Dry Battery manufactured for ignition.
 Its long life means marked economy.

MANUFACTURED BY

The Nungesser Electric Battery Co.
 CLEVELAND, OHIO.

General Sales Office, 128 West Jackson Boulevard,
 Chicago, Ill.

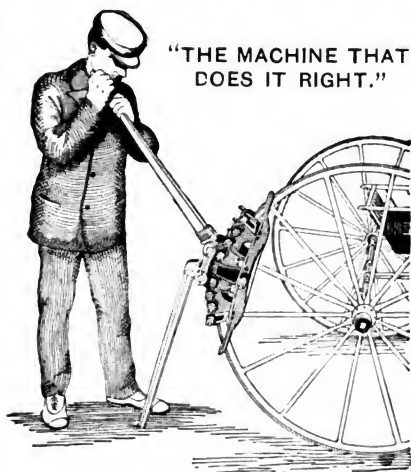


Hathorn's Hard-hitting Helve Hammer.

Ask your dealer or write to

**HATHORN
FOUNDRY &
MACHINE
CO.
GRINNELL,
IOWA.**

SCHAU TIRE SETTER



"THE MACHINE THAT
DOES IT RIGHT."

3,000
in use
in the
United
States
and
Canada

Write for Catalogue.

BURTT MFG. CO.

Kalamazoo, Mich.

5 Reasons Why



Always Sharp Calks are The Best

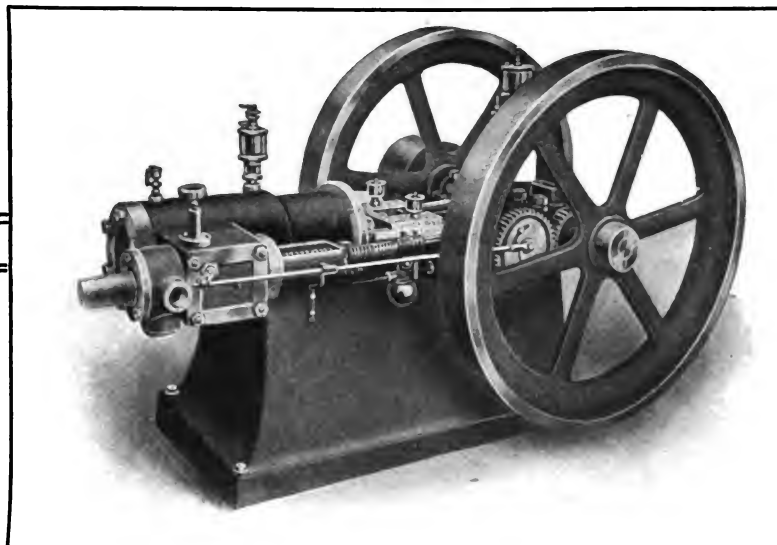
1. Always sharp.
2. Three wedges combined.
3. No special wrench required.
4. Endorsed by all leading Horseshoers who have used them.
5. Made of Best Steel.



Write for sample Calk, Book and Testimonials.

SOLD ONLY TO SHOERS.

Always Sharp Calk Co.
 Springfield, Mass., U. S. A.



**They Never
Balk. Always
Ready for ac-
tion. An En-
gine that can
be relied upon.**

SINGLE CYLINDER

4, 6, 8, 10, 12½
Horse Power.

EVERY UP-TO-DATE SHOP OWNER

Should investigate the proposition we offer. It will net you several hundred dollars per year extra. Write today for particulars. Interesting literature sent free.

**Built Like a
Watch for
Long Service.
Smooth Run-
ning. Most
Economical on
Fuel.**

DOUBLE CYLINDER

16, 20, 25
Horse Power.

THE ROBERTSON AUTOMATIC Gas and Gasoline Engines Are Winners

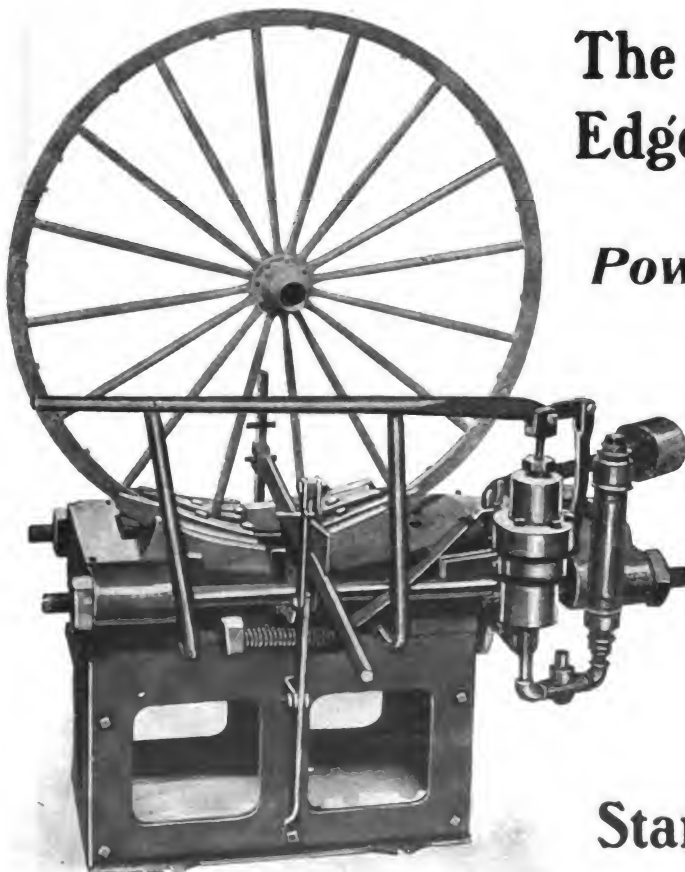
See that cross head, just like a high class steam engine; saves your cylinder 75 per cent., with more power, less fuel and no joints on the inside to trouble you. Improved spark of wise type operated from cam gear. Makes a spark every second revolution when running under full load. Every working part the simplest. Of course, they cost more to manufacture, but we overcome this in the large numbers we make; then, where one goes, more follow, because they are right in every detail. Handsome in design and finish, and full guarantee. Send name and address and we will mail you free of charge, a neat folder, giving full description of all working parts of these engines. Write today.

THE ROBERTSON MFG. CO.

N. B.—Our plant has been doubled to enable us to fill orders promptly.

Niagara St., Buffalo, N. Y.

High Class Engine and
Tool Builders.



**The Scientific, Hydraulic
Edge Grip Cold Tire Setter**

Sets tires cold by a few strokes of a

Powerful Hydraulic Pump

The Warranty Tells the Tale

It is warranted to work as well in every respect, or better, than any other edge grip tire setter, and in addition is warranted to work much

EASIER AND QUICKER

These are two most valuable points in a hand power cold tire setter.

Its gripping jaws grip the tires accurately and let go quickly without the use of a hammer.

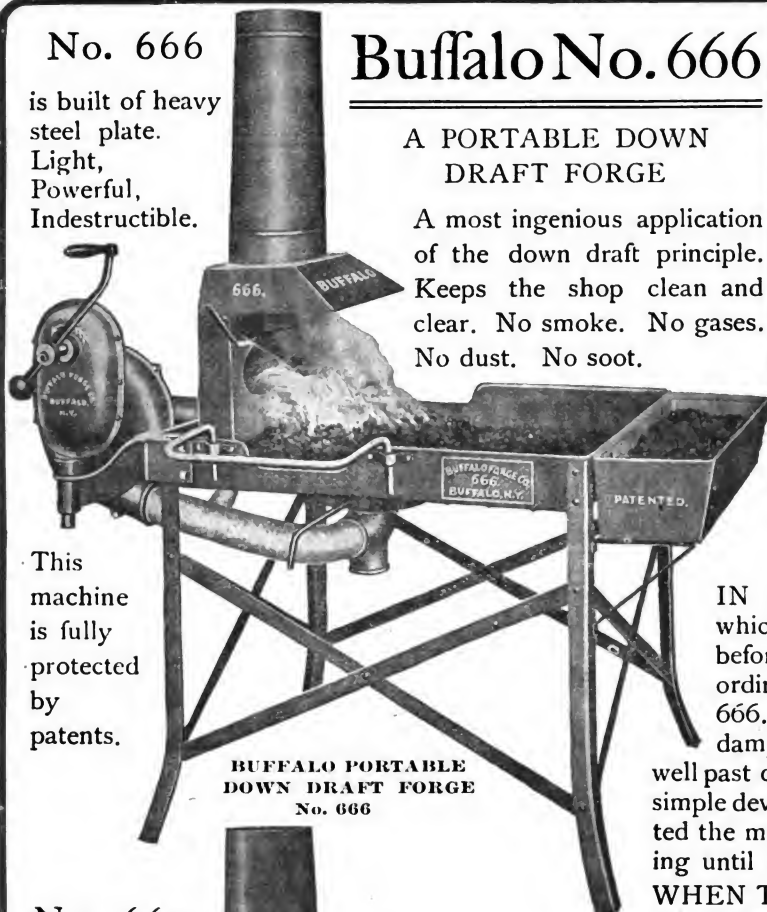
For full information, address,

Standard Tire Setter Co.

KEOKUK, IOWA

No. 666

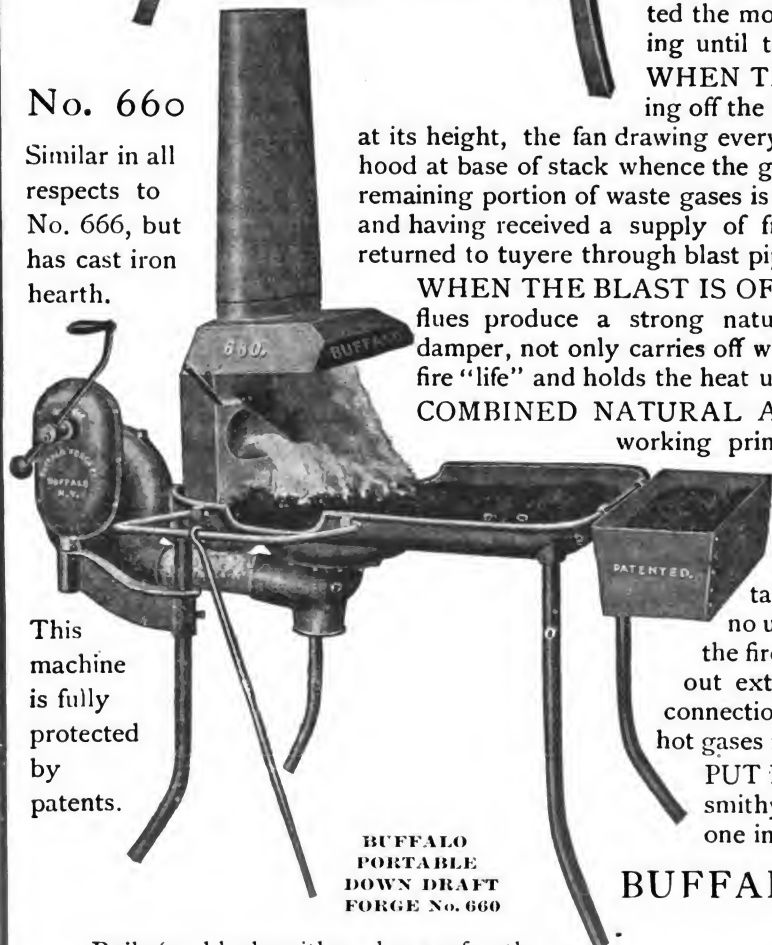
is built of heavy
steel plate.
Light,
Powerful,
Indestructible.



**BUFFALO PORTABLE
DOWN DRAFT FORGE
No. 666**

No. 660

Similar in all
respects to
No. 666, but
has cast iron
hearth.



**BUFFALO
PORTABLE
DOWN DRAFT
FORGE No. 660**

Built for blacksmiths who prefer the
cast iron to the steel plate hearth.

Buffalo No. 666**A PORTABLE DOWN
DRAFT FORGE**

A most ingenious application
of the down draft principle.
Keeps the shop clean and
clear. No smoke. No gases.
No dust. No soot.



Buffalo
Blacksmith
Tools. Highest
Award and

Gold
Medal at
World's Fair,
St. Louis, 1905

HOW IT WORKS

IN STARTING UP, the clouds of smoke which pour into the smithy for some minutes before the chimney begins to "draw" with the ordinary forge are entirely avoided in the No. 666. A special connection provided with a damper leads from blast pipe through hood and well past double flue into stack. By this clever but simple device a strong draft up the chimney is created the moment the blower is turned without waiting until the chimney is heated.

WHEN THE BLAST IS ON and the fire throwing off the densest smoke, the down draft action is at its height, the fan drawing every vestige of smoke, sparks, etc., into the hood at base of stack whence the greater part escapes up the chimney. The remaining portion of waste gases is drawn through a back connection to fan and having received a supply of fresh air through a suitable opening, is returned to tuyere through blast pipe.

WHEN THE BLAST IS OFF and the blower still, the highly heated flues produce a strong natural draft, which, aided by the deflecting damper, not only carries off what smoke and fumes arise, but gives the fire "life" and holds the heat until the smith is ready to handle his work.

COMBINED NATURAL AND MECHANICAL DRAFT is the working principle of the No. 666. The full existing natural draft is made use of aided by the exhausting strength of the No. 200 blower.

NO ADDITIONAL POWER is necessary to operate the blower. In place of taking air at the fan case, where it serves no useful purpose, No. 666 takes air from over the fire, producing the strong down draft without extra effort. A clever device in exhaust connection admits sufficient cool air to prevent hot gases injuring blower.

PUT IN A BUFFALO No. 666 and keep the smithy clean, cool and light. Be the first to get one in your county. Write for complete details.

BUFFALO FORGE COMPANY

BUFFALO, N. Y.

Canadian friends, save duty, buy of
THE CANADIAN BUFFALO FORGE COMPANY, Ltd., MONTREAL

GUARANTEED FOR FIVE YEARS

THERE IS NO RISK IN BUYING
A BUFFALO No. 200 BLOWER

" These machines are hereby guaranteed against repairs due to wear for five years from date of this certificate. All parts wearing out within five years will be replaced free, f. o. b cars, Buffalo."

That's the way the guarantee certificate reads. Duly signed, dated and bearing the seal of the Company, it accompanies every No. 200 Blower sold.

HOW CAN WE DO IT?

No other Blower carries a positive, out and out, guarantee like the Buffalo No. 200.

BECAUSE

No other blower has gears so strong, heavy and broad, with large, properly formed, cut teeth.

BECAUSE

No other Blower has bearings giving so large a wearing surface, with no brass boxes to wear throwing gears out of accurate adjustment.

BECAUSE

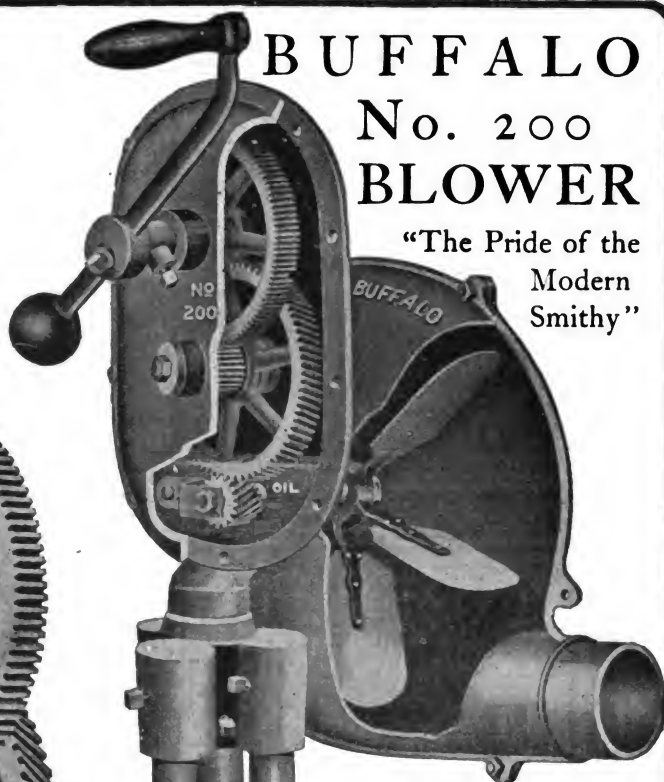
No other Blower has its gears mounted in a cast iron frame independent of casing like the Buffalo No. 200. No amount of racking, dismounting and re-assembling can disturb the alignment of gears.

Gears run in oil in a dust proof, air tight case. Regularly built in two styles. No. 200 turns in one direction for right handed smiths. It can also be built to run in opposite direction. No. 201 turns either way.

Write for full particulars and sample guarantee certificate.

BUFFALO No. 200 BLOWER

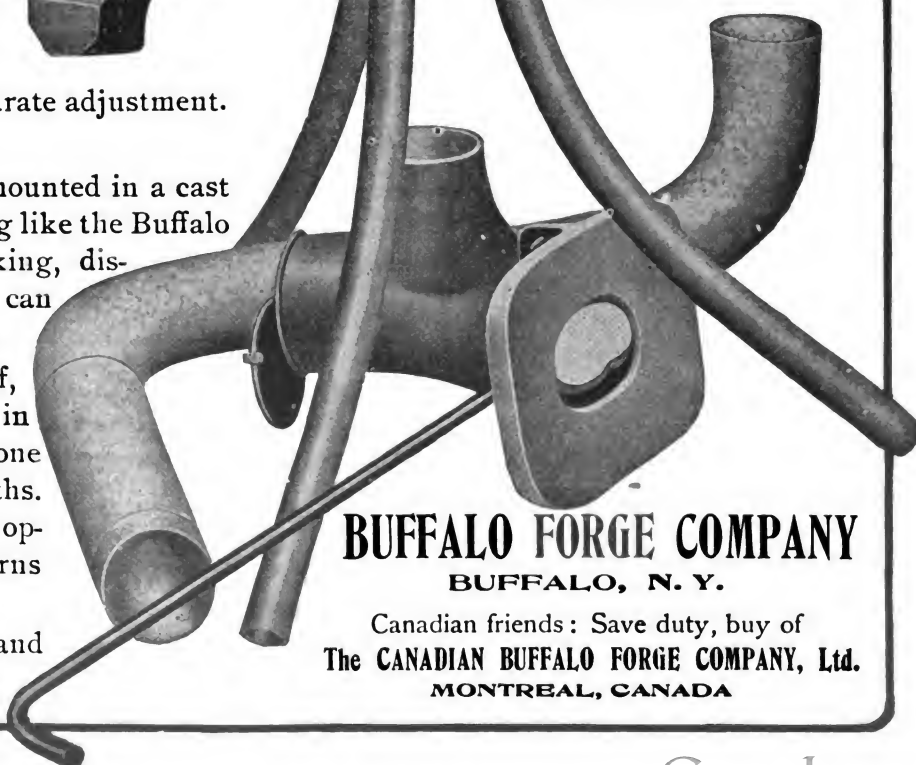
"The Pride of the Modern Smithy"



GOLD MEDAL AT ST. LOUIS

Buffalo Goods received highest award and gold medal at the World's Fair, St. Louis, 1905.

Buffalo Blowers are specified by the Japanese Government.



BUFFALO FORGE COMPANY
BUFFALO, N. Y.

Canadian friends: Save duty, buy of
The **CANADIAN BUFFALO FORGE COMPANY, Ltd.**
MONTREAL, CANADA

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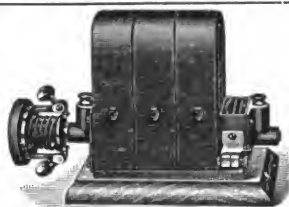
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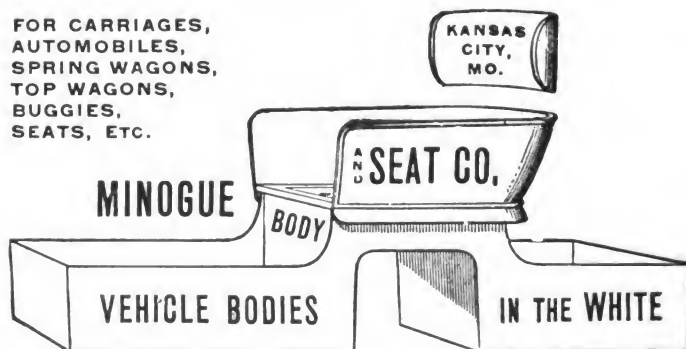
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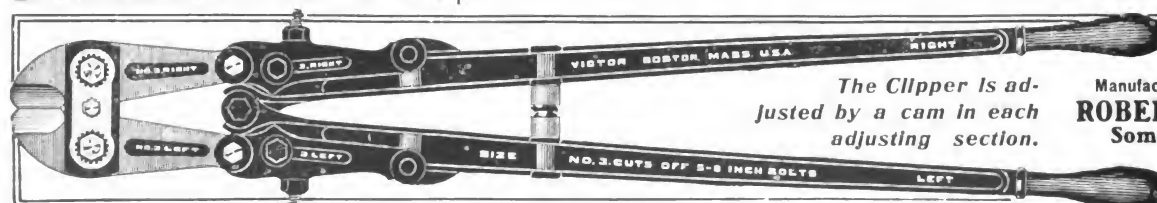
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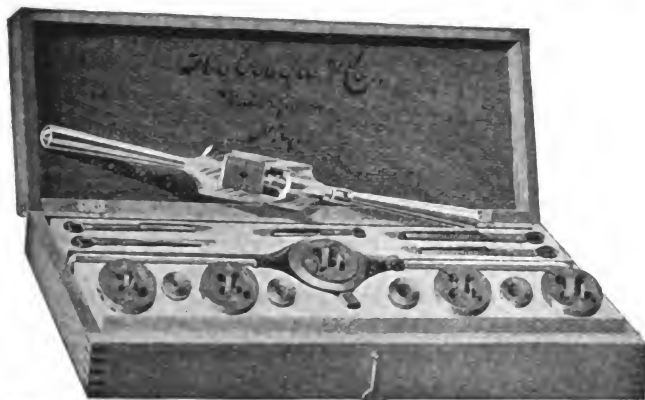
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THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

VOLUME 4

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Change of Address.

Investigation shows that in a majority of cases in which the subscriber complains of the non-receipt of copies of the paper, it is due to his negligence in not notifying us of the change of his address. To some this may seem a comparatively small matter to mention here, but we get letter after letter from readers saying that they have not received the paper for two, three or four months, and usually find that our old friend is writing from a new postoffice and has never advised us of the change. Any change in your postoffice address should be sent to us immediately so that we can make the correction in our files and forward your paper properly. You cannot afford to miss a single issue. Don't wait for the postmaster to forward your mail, but drop us a card giving both your new and old postoffice addresses.

Looking Forward.

At this season of the year the wide-awake craftsman looks forward with anxiety to the prospects for a busy fall season. The promised increase in trade necessitates the purchase of supplies, new tools and machinery, and the smith should attend to these matters now, before the fall rush begins. In

order to properly care for the wants of his customers, the smith's equipment should be complete and probably no other time presents a more favorable opportunity to consider the value of an engine. A majority of our readers realize that the up-to-date shop must be run by power, and the enterprising, progressive shop-owner must be alive to the advantages of new labor-saving machinery and improved shop devices. Power enables the smith to do better and quicker work. It means a saving of time and labor—satisfaction to the customer and more trade for the smith.

If you are considering the purchase of an engine, consult our advertisers. On other pages of this issue will be found the announcements of many representative gas engine manufacturers, all of whom are ready to send you their catalogue, free of charge. It should pay you to investigate the propositions they have to offer.

The Passing of Volume Four.

Another volume of THE AMERICAN BLACKSMITH ends with this, the September issue. On pages 239 and 240, arranged in alphabetical order for easy reference, will be found a complete index of the articles which appeared in the issues of the past year. Our readers find it very interesting to look over old copies of the paper, and this index will assist them in locating any particular article in the volume to which they may desire to refer. Have your copies bound, and as a reference book on practical shop topics, the volume will be invaluable.

The list of articles which the index gives is an excellent indication of practical shop value, and goes far to explain why THE AMERICAN BLACKSMITH is often referred to as "the biggest dollar's worth that goes into the smithy." In view of the amount of practical information, covering such a wide range of interesting and instructive shop topics, such a journal as THE AMERICAN BLACKSMITH is indispensable to every man connected with the trade, both country craftsman and city smith.

The index shows that in the fourth volume there are over twenty articles on various branches of plow work, while on the other hand, there are some thirty interesting and instructive articles on horseshoeing. To say nothing of the vast number of other topics treated throughout the year and the hundreds of useful kinks and improved methods for difficult jobs, the articles above mentioned should alone command any smith's patronage for the journal. Our readers should and do take pleasure in securing subscriptions among their friends. Your brother smiths who are not among our 25,000 readers should be made acquainted with THE AMERICAN BLACKSMITH, and through you we should receive their orders. Since the first issue we have endeavored to produce the best blacksmith paper possible, and the steady growth of our subscription lists proves that such efforts have been appreciated. In subsequent issues we will adhere to our policy of the past, making the interests and general welfare of our subscribers our first object, confident that the blacksmiths of the country will continue in their hearty support as heretofore.

The Scarcity of Apprentices.

BY AN OLD CHIEF.

Judging from an extensive correspondence with the craft in various sections, there seems to be a great and growing scarcity of apprentices, which means a future scarcity of smiths. The main reason for this, I believe, is the small price paid to obtain the apprentice's service. The smith as a general thing works the boy hard, so that he (the smith) can get the most labor for the least money.

That is all right, but why should the young men work three or four years at blacksmithing or horseshoeing and get only their board, clothing and a few dollars for their labor when they can

EDITOR'S NOTE:—This subject is a vital one to the smith today and one which should receive more attention than is at present accorded it. Why not work together and solve this problem? Let us hear from other craftsmen.

get \$10 to \$30 a month at farming or other work not any harder? To be sure, after the apprentice has worked four to six years he can make \$1.50 to \$2.50 a day while the farm hand gets \$.75 to \$1.50 a day, but doesn't the apprentice earn the difference? Let me urge that all the smiths pay their apprentices a reasonable sum, and I think more young men will learn the honorable trade of blacksmithing. It is impossible to give a set price, as some boys will do as much after one year as others do after two years at the trade, but I will suggest the following as a schedule:

First year \$1.00 to \$1.50 per week and board.

Second year \$2.00 to \$3.00 per week and board.

Third year \$2.50 to \$4.00 per week and board.

Fourth year \$4.00 to \$10.00 per week and board.

Rather pay your apprentice a little too much than too little. And if you do your part he will repay the difference. Treat your apprentice as you would like to have had your boss treat you while you learned the trade. Remember, you were a boy once.

Always encourage the boy after he has done a good job, whether it is of much value or not. Get him interested in his work. Treat him right and make him feel at home and if the apprentice is all right he will make a trustful servant. Let us treat the young men fair and square for upon them rests the craft of the future.

Knowledge by Observation.

J. M. FIX.

Any man who has mastered to a reasonable degree the principles of a trade or profession, should by simple observation absorb a great deal of valuable knowledge. But men of equal intelligence often vary in their methods. Have you ever observed how the laws of mechanics are much the same as those of health? Did you ever try to weld any job in a dirty fire, or when the irons were not hot enough, or when they were overheated? If you have trouble along any of these lines, observe the method of some one who does not have trouble with them. All mechanics are weak on some one point, while they are up-to-date on others. A brother craftsman may do dozens of things practically the same as we do, but occasionally he will do something that you never saw done. Observe this one thing: Don't be afraid or ashamed to learn from anyone. Knowledge is what we are after, and we cannot be up-to-date unless our minds are in a receptive state. We must study and

try to improve daily. We must not stop short of the highest ambition to produce the very best that can be produced. No one can attain the highest degree without surrounding himself with best possible conditions: a good shop, proper light, good tools and materials, and shun the tavern as you would a rattlesnake. Let us strive hard to improve all around.

Does the Paint Shop Pay?

C. W.

From my experience with the paint shop, I have reached the conclusion that it does not pay. If you have enough repair work to keep you busy so that you have to employ extra help to run a paint department, then I am quite sure it cannot be made to pay. But if we could all do as well as one of

at painting and then went on. "But there's good money in it. Seventy-five cents worth of material is enough to paint any rig, if you know how to use it. A few hours' work and the thing is done. I could easily make \$15 per day at it, but I don't like it."

There are a good many smiths so situated that they must turn their hand to a good many things to keep busy, and to those I would say that by careful management and close figuring something can be made at carriage painting, but not very much. It is better to be busy at something, even though you don't make \$15 per day, than to be idle. In my mind, there is nothing worse for the smith than a handy chair by the anvil, into which to drop the moment a job is done. I enjoy the discussions in the columns of THE AMERICAN BLACKSMITH, and I still cut the rivets in a Sarven wheel.

Bronze Rail and Iron Lamp Standard.

The two examples of ornamental work shown this month are very beautiful pieces of artistic metal work. The first engraving shows a bronze baluster of very unique design. The leaf work is very artistic and ending as it does in a running scroll which continues up the balustrade, produces a very pleasing effect. The heavy effect of this piece is greatly enhanced by its marble base, which is carved after the same pattern as that used on the metal work.

The second engraving is that of an iron lamp standard. Here also is the leaf effect used to good advantage, both on the base and at the lower end of the column. The ornamental vine work, in relief, on the main shaft is especially fine and is executed in a most artistic manner. Both the examples shown are from the forges of Richey, Browne and Donald of New York City. Their work is not new to our readers as some of their most artistic pieces have been shown in our columns.

Hints for the Country Shop Painter.

Facts and Formulas, Processes and Practices Specially Suited to the Requirements of the Small Shop—Hints of Value to Carriage and Wagon Painters—Helps and Suggestions Tendered.

M. C. HILLOCK.

The editor has kindly asked me to devote this paper to hints specially adapted to the needs of the small paint shop. And the first hint I want to throw out applies directly to the statement made by "E. S." in the June issue of THE AMERICAN BLACKSMITH. Among



BRONZE BALUSTER, SHOWING GRACEFUL LEAF EFFECT.

my customers, then we could make it pay. This man came into my shop the other day as I was putting on a priming coat and said: "You are painting, I see." "Yes, I'm doing a little in that line." "I could make good money at that if I wanted to, but I don't like that kind of work," he said. "Are you a carriage painter?" I asked. "Oh, yes; but I never do any work except for myself. I just finished up one of my rigs a few days ago. A fellow from town was out there and saw the job and offered me \$15 to paint one of his rigs like that, but I didn't care to do it. I could get all the rigs I wanted to paint at that price." "That's a lot more than I get for my work," said I. "I believe it," he said, with a glance at what he evidently considered my poor attempt

other assertions, E. S. says that in 1903 he was running his paint shop at a loss of \$1,300. It appears to me that if I were employing "from three to six painters, according to the time of the year," were painting about 150 jobs a year, and sustaining a loss of \$1,300, I should apply the knife and, if necessary, cut to the bone, to cleanse and relieve the paralytic state of affairs. I would not like to accuse "E. S." of exaggeration, preferring rather to believe that he has been victimized by a bad book-keeper and an equally incompetent force of painters. If "E. S." really intends to be serious and calmly present to us a loss of \$1,300 on the painting of 150 jobs, as he clearly does in the issue referred to, then we can only say in all kindness that his shop must have as many leaks to it as the proverbial sieve. The great Chicago carriage making concern of C. P. Kimball is annually credited with a repainting business of from \$30,000 to \$40,000, and if our friend honestly believes that carriage painting does not pay if diligently followed along strictly business lines, he should write this firm for information. For more than 22 years the writer has been intimately connected with paint shop affairs, large and small, and on the basis of accumulated experience he is free to say that the carriage paint shop conducted upon business principles—that is to say, economically and with consummate ability—will pay a handsome dividend upon the capital invested. We have, to be sure, a record of many failures, but over against these failures is written a great company of successes—of painters who, without money and quite unknown to the public, started modestly in business, and today are well to do, with an income that compares favorably with the income of other shrewd and thrifty business men. Yes, the carriage paint shop does pay, must pay and will ever continue to pay if it is conducted upon a modern, 20th century business basis.

H. H., in a late issue of THE AMERICAN BLACKSMITH, complains of varnish crawling on black, and says that it is impossible to make the varnish stay unless the surface is wet with a sponge. He thinks all colors do not act this way, but in this he is mistaken, because all colors under certain conditions, and by a certain proportion of rubbing varnish or raw linseed oil employed in mixing, will cause the varnish used directly over them to crawl. This deviltry is not due to any inherent fault of the color, but is due to a certain semi-gloss along with a

half slippery condition of the color surface which offers no foothold for the varnish, consequently it crawls or slides off. Sometimes this trouble is caused by a damp, impure air which apparently deposits a greasy substance upon the color to which the varnish fails to adhere, with the result complained of



IRON LAMP STANDARD OF UNIQUE DESIGN.

by H. H. More often, however, it is due to an overdose of oil or varnish in the color during the process of mixing. Use Maswray's colors, or the colors of any other reputable manufacturer, as per the directions on the can, that is, by simply thinning with turpentine, if a japan ground color, and you will rarely, and perhaps never, meet with a case of varnish crawling off the color.

The small jobbing shop painter, if located in close proximity to the wood and blacksmith shop, is no doubt annoyed to a greater or less extent by frequent requests for "a brush and some touch up color" for this, that and the other job. In which case it will prove real economy to furnish each of these departments, if conducted separately from the paint shop, with a brush and a pot of the most used color, to be kept permanently in the above departments, thus doing away with the bother of stopping other work for trivial accommodations which are nice to bestow, but in the aggregate are expensive.

The painter in the small shop who uses carmine less frequently than his brother in the larger shop is more apt than not to use more carmine than is necessary when preparing this beautiful pigment for use. The main consideration is to get the ground color as perfect, practically, as the glaze coat should be, and when this is obtained all that the glaze coat is expected to do is to enrich the ground. For this purpose use simply enough carmine in the rubbing varnish to stain it strongly—say, $\frac{1}{4}$ of an ounce of carmine to a full $\frac{1}{2}$ gallon of varnish. Used in this proportion the glaze coat works more freely, flows out better, and displays a far greater measure of brilliancy.

The small shop painter will find it the more economical way to buy his varnish in small cans, pints and quarts. Provide these cans with rubber stoppers for the better exclusion of air, and because they wear durably, and keep the varnish supply in a warm, clean place. A can of varnish once opened, and thereafter opened frequently, soon thickens in contact with the air, and from this condition it quickly passes into a fatty state from which it can be recovered only partially by the addition of turpentine; and then the lustre and brilliancy will be largely destroyed. Lack of proper handling of varnish is more often responsible for poor results than are the surroundings and local skill and conditions generally.

In country towns where the small paint shop must take work as it comes, the canvas top wagon visits the shop regularly, and the best way to paint the top is the vexed question. Try this formula: Size with hot glue water, if a new top, using two coats, with 24 hours intervening. Then apply a coat of white paint mixed of white lead ground in oil, $\frac{1}{2}$ raw linseed oil, and $\frac{1}{2}$ coach japan and turpentine, equal parts, being employed to reduce the lead to a

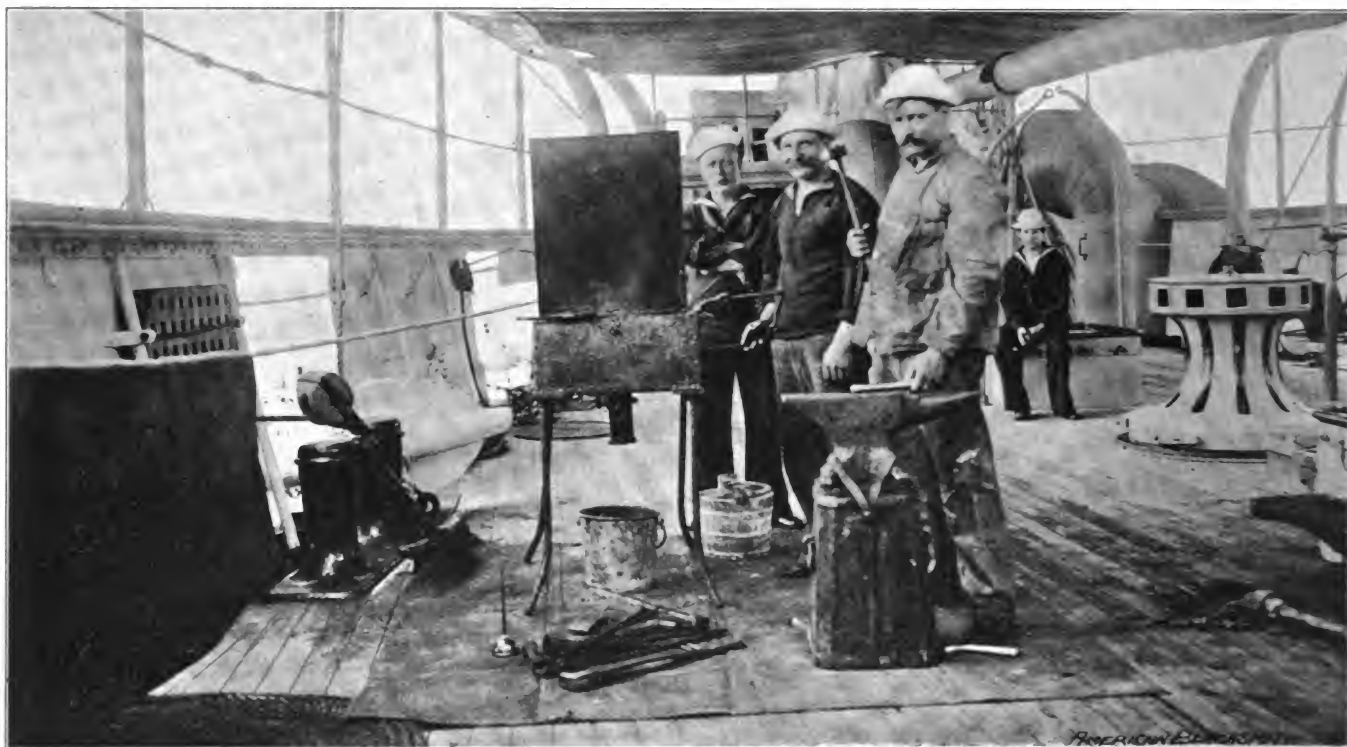
brushing consistency. For the second coat of paint, after an allowance of five days for the first one to dry, mix the lead in $\frac{1}{2}$ raw linseed, $\frac{1}{2}$ coach japan and $\frac{1}{4}$ turpentine. Allow three days for proper drying, and then sand off lightly, and apply white color and varnish. Rub this coat sparingly, letter and ornament and in due time finish. For a quicker finish add four ounces of white vitriol in a gallon of water and use bolted whiting until a spreading consistency is reached. Coat top and curtains and apply the desired paint directly upon this whiting—vitriol foundation, and finish in the usual way. This develops a quick, clean finish at less ex-

painter in the small shop, where conveniences and facilities are at the best, not conducive to mirror-like surfaces?

The shop mixed black-color-and-varnish—and in the country paint shop this is a common article—all too often carries too much color in proportion to the quantity of varnish. The result is a mongrel surface—an unfortunate medium between a dead color and a surface of great brilliancy. And over such a color the varnish is pretty sure to crawl when the temperature is not quite right. Varnish color, whether shop mixed or bought of the varnish maker ready for use, should carry sufficient varnish to furnish a surface of good

deeply to hasten drying. Then, when this bulk of putty has dried hard, re-putty, filling level with the surface, and using the regular hard drying putty as above described.

The country painter is bound to get some old carriage or wagon surfaces badly cracked and fissured which the owners want fixed up in the best way possible on the old paint. Take equal parts of roughstuff filler, dry white lead and whiting, and mix to a stiff consistency with equal parts of couch japan and quick rubbing varnish. Apply this mixture with a stiff bristle brush, working the pigment well into the cracks. Let the mixture stiffen



A BLACKSMITH SHOP ON BOARD A BATTLESHIP.

pense than the regular glue size formulas.

How many painters who read the *AMERICAN BLACKSMITH* strain their color and their varnishes? A generally needful practice, nevertheless, and especially when using materials that have stood for some time; for, try as we may, dust and other foreign matter will accumulate and somehow get into the seemingly tight closed can. Cheese-cloth cut into eight-inch squares and clasped over the paint or color pot, furnishes useful strainers. Varnish should also be strained as a matter of precaution. The best carriage body finishers in the country, the men who turn out works of art in the leading shops and factories, invariably strain varnish before using. If a good practice for the specialist, why not equally good for the

brilliancy both at the time of application and when it is dry.

A good, sure putty for the jobbing painter may be made of three parts dry white lead, one part gilders' whiting, and equal parts of quick rubbing varnish and coach japan. This putty will dry to sand paper freely in 24 hours. A putty especially intended for deep holes and cavities is made of one part dry white lead and three parts whiting mixed in equal parts of raw linseed oil and coach japan. With this mix in enough plush woof, picked carefully apart, to give the putty great adhesion. At the bottom of the hole drive some tacks and then crowd the putty into the cavity, filling it nearly level with the surface. With the point of a pen-knife slash the putty a couple of times quite

up considerably, and then with a $2\frac{1}{2}$ -inch blade French scraping knife work over the surface, pressing the pigment well into the fissures. Permit this to dry for a couple of days, and then rub out with a block of composition rubbing stone dipped in raw linseed oil instead of water. After rubbing out allow the surface 24 hours in a warm, dry air to season, after which it may be brought to a finish in the usual way.

Information imparted to the owners of vehicles, like bread cast upon the waters, may, after many days, return with profit threefold. Do not be afraid therefore to give special advice to your patrons relative to the care of the carriage. If anything, this information is more necessary in the country than in the city. In the first.

place acquaint the carriage owner with the fact that the carriage house or apartment should be a clean, dry, light and well ventilated affair, entirely separate from the stable or from the corrosive effects of the manure pile. Nothing destroys varnish so quickly and so permanently as the ammonia contained in horse manure. Furthermore, the owner should know that the carriage, newly finished, should not be washed in the sun. In washing, employ a clear, soft sponge and a chamois skin absolutely clean and devoid of lint. Use plenty of water, and arrange to flow the water gently down over the panels or surface so that the dirt accumulations will soften up and

to do, but he must be able to execute any job from the repairing of the figure-head at the bow to the forging of a new flag-pole socket at the stern.

The shop equipment consists of an anvil mounted upon a wooden block which is fitted with two large rings for convenience in handling; a forge of the folding type, known as the army and navy style, and built by the Buffalo Forge Company. This forge is especially suited for use on battleships, in that its various parts—blowers, gearing, tuyere and legs—may be readily detached and folded within the case. The size of the blower fan is 12 inches, and the entire forge when folded occupies a space $12\frac{1}{2}$ by $27\frac{1}{2}$ by 10 inches. The

outside according to the inclination shown at D, which is a section of the side. The standards FF are $\frac{1}{4}$ of an inch thick, and are lapped from the outside of the sill. They have the same inclination as the outside surface of the sill. The corner pillars are $\frac{1}{2}$ by $1\frac{1}{2}$ inches and are lapped from both the side and back of the sill as shown in Fig. 4. This method not only gives great strength to the pillars, but gives a better glueing surface for the back panel, covering up as it does so much end grain. This is not only a bad surface to glue to, but is an absorber and retainer of moisture which is so frequently the cause of the panels coming loose at the corners. After the frame

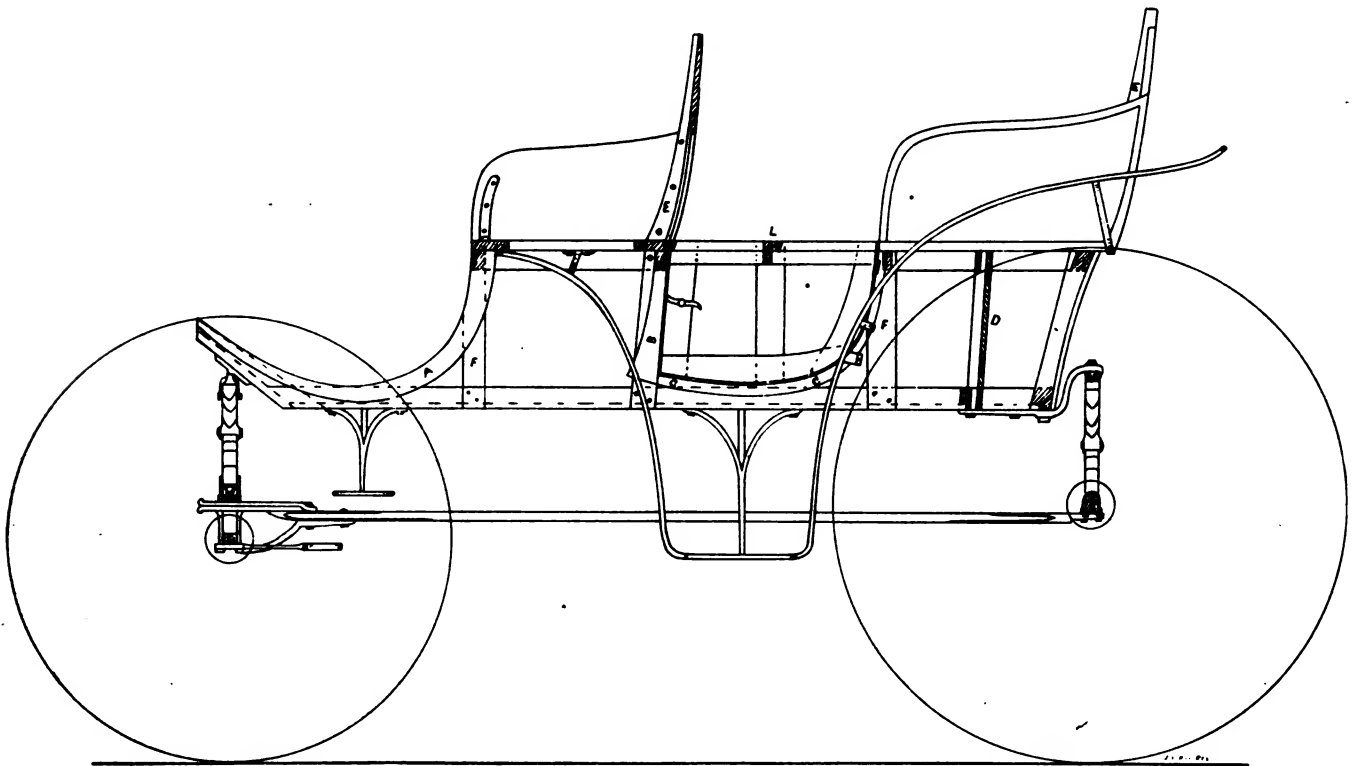


Fig. 1.—SHOWING SIDE ELEVATION OF STRAIGHT SILL SURRY.

wash off the surface without injury to the varnish. Wash the running parts just as carefully as the body and wipe dry with the chamois skin. Mud accumulated upon the recently finished vehicle should be washed off immediately. Wash the recently varnished carriage frequently—it hardens the varnish and increases its brilliancy.

The Blacksmith Shop on the Battleship.

The accompanying engraving shows the smith shop on the United States Flagship Chicago. The equipment, although not as complete as that of the army shop, is sufficient for the work usually performed on the floating fortress. Unlike his brother in the army, the battleship smith has no horseshoeing

rest of the equipment consists of hammers, tongs and such other tools and implements which are a necessity to the proper execution of a job on ship board.

Plans for Making a Straight Sill Surry With Doors.

J. LAWRENCE HILL.

This is a very popular vehicle with the driving public. It is a fine country carriage and one very easy to build. The doors are in the nature of a novelty. They are a decided advantage when it comes to keeping out the dust, besides adding to the appearance of the vehicle.

In Fig. 1 we have the side elevation, showing the framing, together with the length and height of the various parts. The sills are $\frac{1}{2}$ by 2 inches, dressed up square. The side flare is put on the

for each side is together, glue on the panels. When dry, set up and put back bars in with a strainer $2\frac{1}{2}$ inches wide by $\frac{3}{4}$ of an inch thick of white wood in the center. Then glue on the back panel. While this is drying, fit in the toe board, cross bars and bottom and clean off the body, when it will be ready for the seats.

The seat frame is made of $3\frac{1}{2}$ by $1\frac{1}{2}$ inch ash. The short or side pieces are mortised to receive the long pieces. This will prevent any end grain or joints showing on the side. The seats are framed up square and afterwards cut to shape of G, Fig. 4. The seat sides are gotten out of a 2-inch plank. First make a pattern according to the shape on the side elevation and then

cut out according to it. Now mark the line H, Fig. 3, in the back, $1\frac{1}{2}$ inches from the inside of the panel. Now mark the line on the front and connect these two lines on the top and bottom

back. As the sides are contracted, E, where it touches the panel, must be leveled according to the line G, Fig. 4, otherwise the back panel, which is glued to E, will not fit all over the

the outside panels and should be very carefully fitted to ensure a tight joint. The bottom of the panel fits into the rabbet made in the seat frame. The top cross bar also has a rabbet which fits over the panel, thus securely holding it together. The inside of the panel should now be canvassed and the result will be a good job.

The seats are now ready to be cleaned up. Round the mouldings and finish smoothly, care to be taken with the back moulding K, Fig. 3, as this is end grain, being the back end of side panels, and unless it is finished evenly, there will be trouble in painting. Screw the seats onto the body, both at the sides and the cross-bar, one of which runs under each seat both back and front. Now fit and glue the filling in or duster pieces A, B, C, Fig. 1. The pieces A and C at the top are even with the seat and taper down to $\frac{3}{8}$ of an inch in such a shape as to carry out the line J, Fig. 3. Both A and C can be made from a bent rim which can be adjusted easily to the required shape by a little soaking and bending. The piece B is lapped over C, and A, B and C are screwed from the inside of the panel, thus preventing them from ever falling off.

The doors now call for attention, though in practice these may be made up sooner, if the body-maker is waiting for the glue in other parts of the body to set. A section of the top door rail is shown at L. This is $\frac{1}{2}$ inch wide by 2 inches deep and cut out as shown, $\frac{3}{8}$ of an inch for the panel. This leaves a balance of $\frac{1}{8}$ of an inch on the inside, which is the thickness of the remainder of the framing. The joints are of the common half lap. When framed, fit the panel into the groove and then glue it onto the framing.

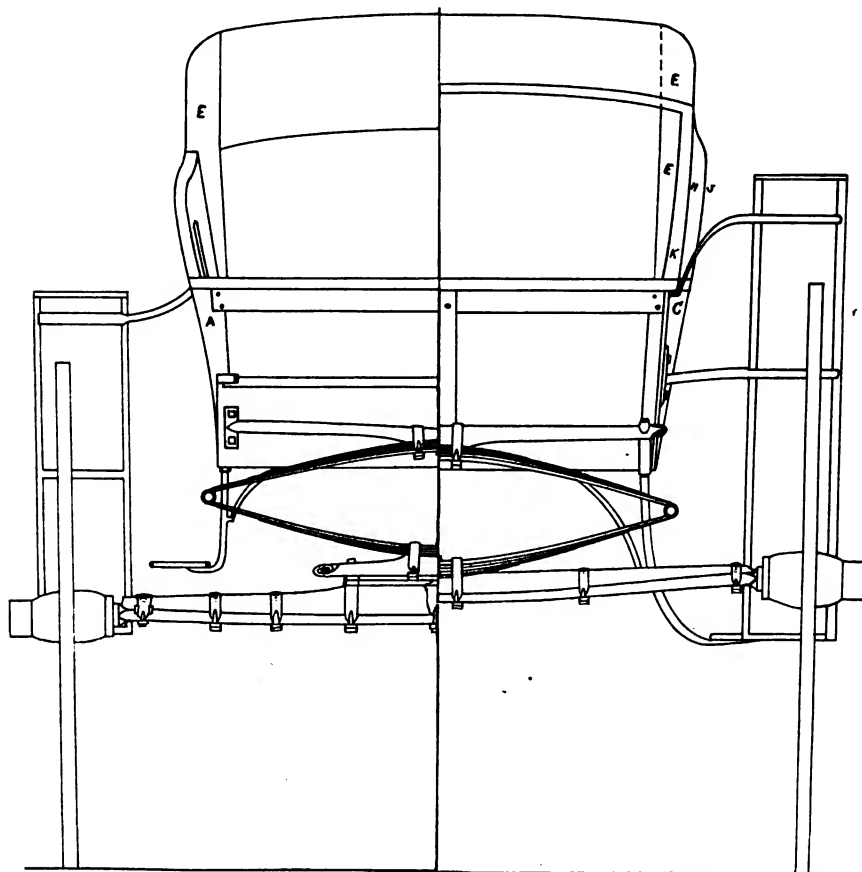


Fig. 2.—SHOWING HALF FRONT ELEVATION.

Fig. 3.—SHOWING HALF BACK ELEVATION.

of the panel by a line similar to G, Fig. 4. Dress off the outside down to these lines. The result will be a very nice and neat convex surface.

To cut the mouldings, gauge one inch from the edge all round except at the bottom (the seat frame forming the moulding there) and box down $\frac{5}{16}$ of an inch. This leaves a solid moulding, which is by far a better job than

surface. In the back of the seat frames, cut a $\frac{3}{8}$ -inch rabbet, $\frac{3}{8}$ of an inch from the outside and $\frac{3}{8}$ of an inch deep. This is for the back panel. Now set the sides up. There is a flare of one inch to each side. To obtain this, plane off the bottom outside edge of the panel, then screw up through the seat frame with number 14 screws. The back panel is very easily filled. It

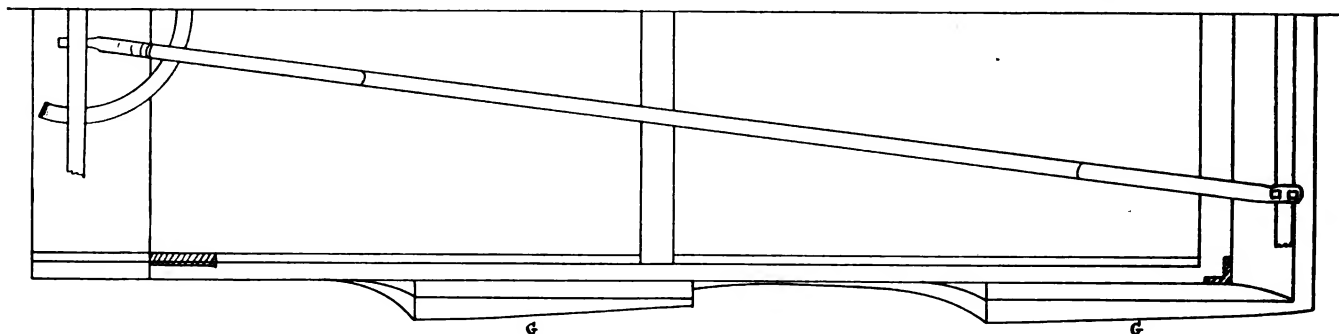


Fig. 4.—SHOWING HALF PLAN OF BOTTOM OF BODY.

would result by brading one on.

The front seat in Fig. 1 shows the inside of the panel of the opposite side of the carriage. The piece marked E is made of ash and is glued and screwed to the side panels $\frac{3}{8}$ of an inch from the

should first be bent to the shape of the seat. This can be accomplished by holding it over the forge fire and keeping the reverse side wet, or it may be laid on a heap of wet sawdust over night. This panel butts up against

When hanging the doors a bent hinge will be required for the bottom, but keep the pivot as far forward as possible. This will throw the door, when open, out of the way of the fender. It would appear from Fig. 1 as if the door would

not open properly, but the door is narrower at the bottom than at the top and the fender is also several inches from the body. Both of these things help us to keep the fender as far forward as possible in order that the spring, which is directly over the center of the wheel, may be as close to the body as is desired. The door has a brass T moulding around three sides of it. This can be obtained from any carriage hardware dealer and is easily bent to the shape of the door. It covers the opening and fastens the panel securely to the frame.

panels, black mouldings, striped with a fine line of straw color.

The finished vehicle is shown in perspective in Fig. 5, with an English canopy top. It will be seen that this makes a very fine appearing job, and when well made it will fill the bill for a very durable and stylish carriage, such as any builder would be proud of.

The Parson and the Hot Iron.

GEORGE NABLO.

Here is an old story which may be new to some of the younger members of the craft. In a village in Germany, a

and claimed that his young boy knew better. So he called his boy and told him to get that piece of iron. The boy looked at the iron, then spat on it and said, "Why, father, that iron is hot." "There," said the smith, "you see that blacksmith boy is wiser than people who have a college education." The parson said he certainly had learned something and would try to remember in the future, that if he ever was in doubt about anything being too hot to handle, he would spit on it. Not long after this the parson was called to

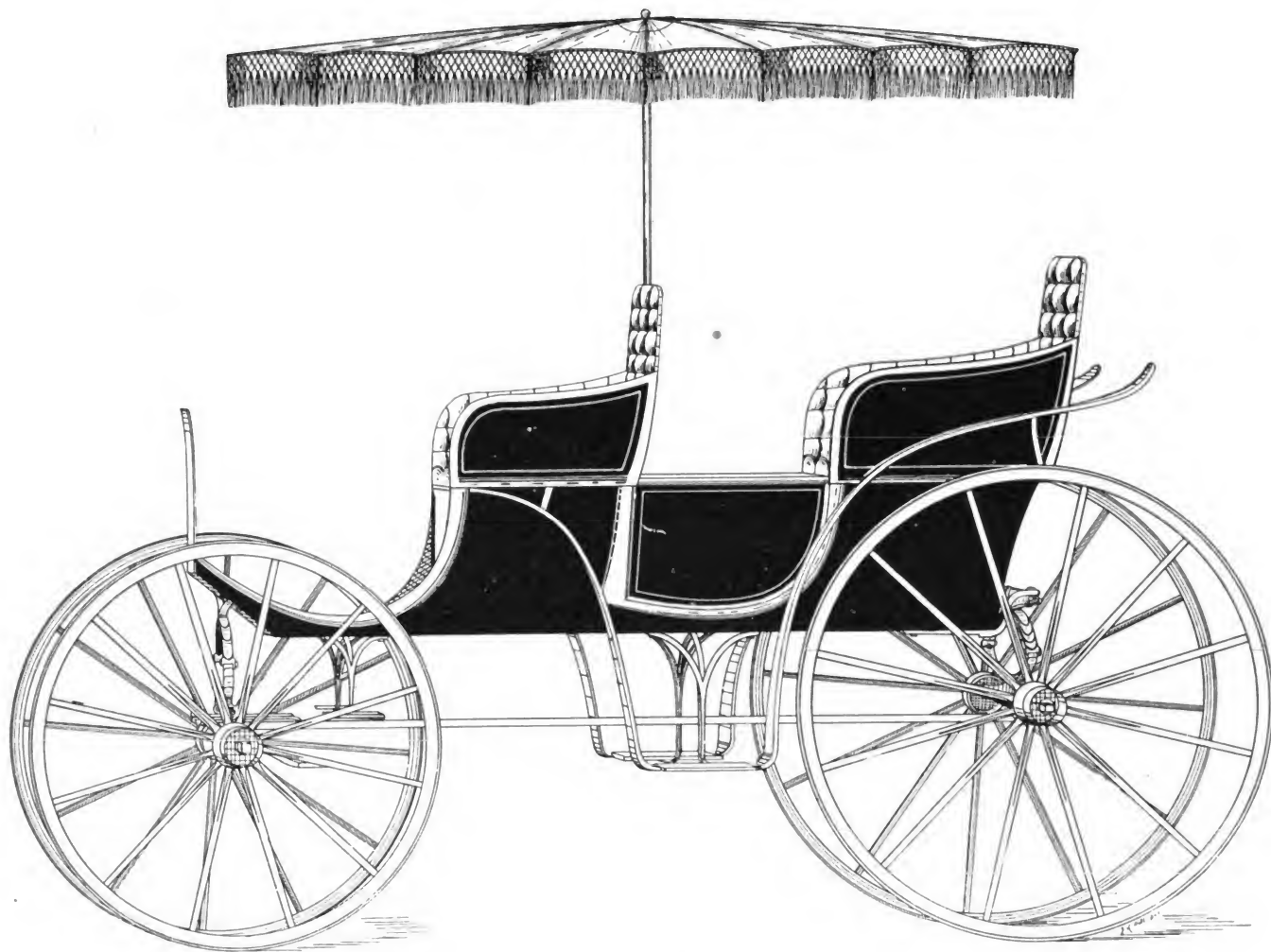


Fig. 5.—SHOWING PERSPECTIVE OF FINISHED SURRY WITH CANOPY TOP.

The dimensions of the surry are as follows: Body, 6 feet long by 32 inches wide on the bottom and 34½ inches on top; seats, 38 inches long on the bottom in front and 40 inches on top; the front is 17 inches deep on the seat by 11 inches high; the back is 20 inches deep by 14 inches high; front springs, 35 inches long by 1½ inches wide with a 7-inch opening between the main plates and four plates thick; the back spring has five plates and has a 7½-inch opening; tires, 1½ by ½ round edge steel; axles, 1½ half patent with 4 feet 8-inch track; wheels, 3 feet 2 inches and 3 feet 8 inches. Painting—medium green

blacksmith, fond of practical jokes, looking down the street, saw the village parson on his way to the shop. The smith at once went to his forge, heated a piece of iron not quite red hot and threw it on the clay floor of the shop near the door. When the parson entered, the smith pretended to be very busy and asked the parson to hand him that particular piece of iron. The reverend gentleman on attempting to pick it up, dropped it very quickly, of course, and told the smith that the thing was hot. The latter feigned surprise that so learned a man could not tell a hot iron from a cold one

officiate at the christening of an infant at the house of the smith and as usual he was invited to stay for dinner. When everything was ready and those present were seated around the table, the parson was asked to dish out the soup. He looked at the steaming bowl and fearing it might be hot he of course tried the blacksmith's method and spit in the soup. The smith who was much surprised as well as annoyed asked what he did that for. The parson replied that he had burned his fingers because he didn't spit on the iron, but he wasn't going to burn his mouth if he could help it. Of course

the smith then realized the joke had been turned on him and you may be sure that he played no more jokes on the village parson.

Tools for The Well Driller.

LLEWELL R. SWARTZ.

The accompanying engravings show a spear and a spud for the breaking or driving down of stones which have become lodged around the drilling tool. The plans as shown are so plain that very little explanation is necessary for their full understanding. The spear A may also be made with but one wing at the point, for close work, as shown at B. These wings should be of steel, so as to be able to stand the rough usage which they necessarily receive. The dimensions of both spear and spud are as follows: The sinker or part between the rope eye and the jar links should be of $\frac{1}{2}$ -inch stock and as long as convenient; the jars should have an 8-inch stroke and be of $\frac{3}{4}$ -inch square stock; the tool proper may be any length, according to the work to be performed, but is of $\frac{3}{8}$ by 2-inch stock; the points of the tools are made of any suitable sized steel stock, according to the size and dimensions of the work. At C is shown the shape and plan of the driving spud. If there is little room in the drill holes, as sometimes happens, both these tools may be made of thinner and longer stock and be concaved throughout their entire length. In such cases the rope eye, sinker and upper link together should weigh from $\frac{1}{2}$ to $\frac{3}{4}$ as much as the lower link and other parts of the tool. A jar link ready for welding to sinker or tool bar is shown at D. The heads of these links are formed by welding a piece of suitably sized stock between the reins or forks of the link. Two pieces of this kind are linked together before welding them to the sinker and the tool.

Just a word of caution to the smith manufacturing drillers' tools. Always know the size of the drill hole and of the

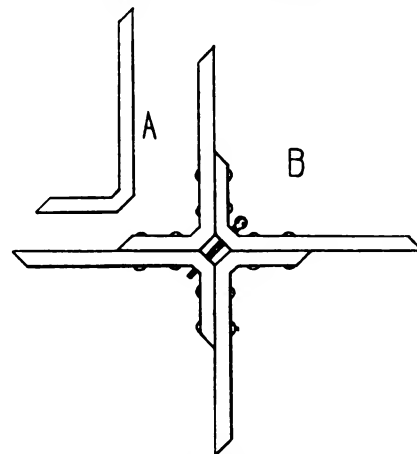
pretty well," answered the older man. "How do you find business in Tupperville?" "Business is very good in our town," answered Sam. "Since I started there two years ago I have been steadily increasing my business. Remember when I left your employ you advised me to do my best in helping customers out of a bad fix and to always make an honest effort to repair any break-downs that were brought to me. Well, I have succeeded in most cases, but what brings me here now is to consult you on a job which the other smiths have refused and which I could not figure out. I remember that you always found some way to do nearly every difficult job brought to you, so I came to ask your help." "All right, Sam," replied the other, "I will do what I can, if you will state the case." "I am asked to make a fan wheel for a blower on a threshing machine," continued Sam. "This wheel is to be of wrought iron, as a cast wheel will not stand. The wheel must have a square hole in the hub to fit the shaft and the four spokes, on which the wings are to be attached, must be of equal weight, so as to balance well. I think it a pretty difficult job." When Sam had finished his explanation the boss asked, "What part of your body do you use most, Sam?" "That is a singular question," said Sam, "but I will answer it. I use my hands and arms and eyes most." "That's what I thought," said the boss, "but as you came for advice, I would ask you to use that grey matter in your cranium a little more. You will find that it can be trained as well as your eyes, arms and hands, and to assist you in your training, subscribe to THE AMERICAN BLACKSMITH. This paper will give you the benefit of contact with more experienced men and will enable you to get advice on nearly anything that puzzles you in your line of business. "As to that wheel," continued the older man, taking up a piece of chalk and a

shaft and the job is done." "Well, now, that's simple," said Sam as the boss finished his explanation. "I can easily do that. Thank you ever so much. I will also follow your advice-about that paper, right now."

A Short Talk on Drills.

DATTON O. SHAW.

It has been proved that a forged drill is superior to all others for certain kinds of work. The engraving shows several stages in the forging of a drill.



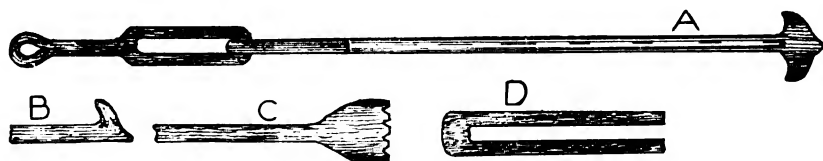
HOW SAM MADE THE FAN WHEEL.

To make a $\frac{5}{16}$ -inch drill, take stock the size you want your shank and shape it as shown at A. Next draw down the top part to $\frac{1}{2}$ -inch square and then round it like B. Too much rounding will cause the end to split and spoil it for a tool. Now flatten and trim as at C.

To make a $\frac{1}{2}$ -inch chuck drill I take stock 1 by $\frac{1}{2}$ -inch and 8 inches long, and with a top and bottom fuller I forge this down to $\frac{1}{8}$ of an inch for 2 $\frac{1}{2}$ inches from the end. Then I draw out, but keep the thickness flatwise and round the corners with the swage. I then flatten it out. This gives $\frac{1}{8}$ of an inch clearance, which is sufficient. Some machinists like to have the lips turned on this kind of drill. The engraving at D shows the position for lipping a chuck drill. The end is sometimes finished with a file before tempering.

In tempering forged drills for hand power, draw them to a dark blue; chuck drills to a dark straw, and chuck reamers, which might go a little harder, to a light straw. There are different methods of tempering drills for cutting chilled castings, saw plates, etc., but I have had the best success in heating the tip end to just where it will harden in oil and not draw the temper. This point is so near a water anneal that it will be well to try it with a file and see if it has hardened.

In grinding drills care should be taken to have the point in the center and the lips of equal length. If one



TOOLS FOR THE WELL DRILLER.

drilling tools before laying out your fishing or driving tools to be used in the hole. This will enable you to make your tools effective.

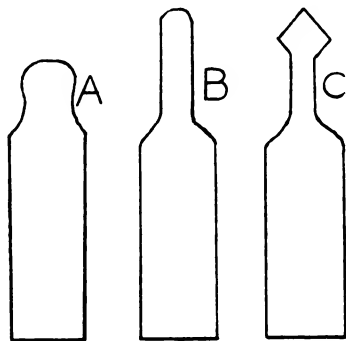
How Sam Made the Fan Wheel.

GEORGE NABLO.

"Good morning, boss," said Sam, as he entered the shop of his former employer. "How is everything?" "Oh,

slab of wood, "take a piece of stock $\frac{1}{2}$ by $\frac{3}{8}$ of an inch, cut the lengths required and bend them at right angles, as shown at A. When you have four of these pieces prepared with the required holes, rivet them together as shown at B. You now have your fan wheel. Now rivet the wings on this frame and drill a hole for a pin key through the hub and

lip is longer than the other it will cut a larger hole. A good way to remedy this is to grind one side of the drill and then make a print in a soft board. Now grind the other side of the drill to fit the print. Continue grinding and printing until both sides are equal. When grinding a twist or a Palmer drill, take the drill in both hands and start it on the emery at the edge of the lip



A SHORT TALK ON DRILLS.

and roll back past the center. Then start the same as before and continue until ground. This will give good clearance and it will cut freely.

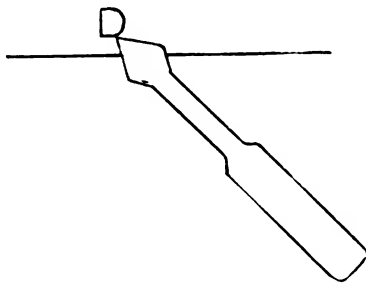
A Damascus Blade.

W. D. GRAVES.

Blaysdell, although he takes several good technical papers, sometimes wastes time in reading the newspaper science in the "patent insides" of his local paper. Time which might better be spent in smoking and meditation. During one of these periods of waste he saw the statement that no modern mechanic could do damaskeening as well as it used to be done, and that it was impossible for a workman of today to inlay copper or other soft metal in tempered steel. Blaysdell never "took much stock" in the "lost arts," and doesn't believe that we have been pounding iron and scratching our heads for the last thousand years for nothing. He decided that he could damaskeen a knife blade successfully.

He first made and tempered the blade, giving it all but the final polish. Then, when it was cold, he dipped it in melted paraffine, thus giving it a thin coat of the wax. In this, with a nail filed to a chisel point, he traced the design he wanted. Around this design he then built a "tinker's dam" of paraffine. Then, with the blade laid flat he filled the cavity thus formed with a mixture composed of one part nitric and three parts muriatic acid and then left it till his design was eaten in about $\frac{1}{32}$ of an inch, when he washed the blade carefully in cold water. He now filled a gallon butter jar nearly full of soft water and put in half a pound of blue

vitriol, stirring it till the water had dissolved all it would. He suspended his blade in this liquid by a piece of copper wire, attaching the wire to the tang, and being careful that the paraffine was scraped off at the point of attachment, so that the wire made good contact. By another wire he suspended a piece of copper. This he connected with the positive pole (copper part) of



the battery which he uses to ignite his gasoline engine, and then connected his blade with the negative pole or zinc part of the battery. This resulted in filling the cavities which had been eaten out by the acid, rapidly with pure copper. When this was done he rubbed off the paraffine and gave the blade its final polish, which gave him as fine a job of damaskeening, barring the artistic merit of the design, as was ever done in old Damascus, and this blade could be ground without disturbing the design.

The design may be cut as deeply as desired in this way, giving time and enough acid, and any kind of battery will do, though the copper will be deposited more rapidly by a stronger battery. The battery generally used with gasoline engines would not be economical for continuous work. In the same way gold, silver or almost any metal can be deposited, though the process is simplest with copper. Blaysdell's experiment served to show that the mechanics of a thousand years ago weren't such wise men after all.

How I Repaired a Set of Light Shell Band Wheels.

M. A. FOSTER.

The wheels were very loose, in fact when the tire was removed, some of the spokes fell out of the hub. The customer wanted a cheap job, and as there were no spokes available for this job, I had to do the best I could. So I took out the spokes and made a lot of wedges just the width of the tenons and a fraction shorter, all of a uniform size. I took a small chisel and split the tenon about $\frac{1}{4}$ of an inch from the back and

started the wedge. Then I applied glue to the tenon and drove the spoke so the large end of the wedge struck the boxing. It forced it up in the spoke and made it very tight. When I had all the spokes driven, I replaced the rims, wedged them up and after the tires were set, the wheels appeared to be quite solid and in good condition. But I can't tell you how long they will last, for a shell band hub is very hard on spokes, as the band seems to cut into the spokes when they become loose.

A Handy Kink for the General Repair Man.

PARKER CLARK.

Most men in buggy repair shops find in putting clips on axles or springs that if the clip fits as close as it should there is some difficulty in getting the yoke on the clip. Now to do this easily, I take a pair of light steel tongs and on the end of one handle I forge a fork as shown at A. On the other handle I turn a hook, as at B. A $\frac{1}{2}$ -inch turn is enough. They should be made so the turned end will just fit in the forked end when closed. Now place a clip on the axle. One end goes in the yoke hole but the other end projects too far to go in easily, so by placing the forked end against this end and the hook, it will go into place easily by just



A HANDY KINK FOR THE REPAIR MAN.

giving a pull on the tongs. This attachment is easily made, is a very handy tool and does not interfere with the regular use of the tongs.

Making Spurs as a Side Line.

FRANZ WENKE.

Talking about side lines, a man can make quite a little money at forging spurs. At present I am making some for three dollars a pair. I take a piece of old wagon spring and forge out a piece about $\frac{3}{4}$ by $\frac{1}{4}$ by 9 inches. This I file to shape and bend to fit the heel of the riding boot, then drill a $\frac{1}{16}$ -inch hole in the center of this bent piece, rivet the shank holding the burrs in at this hole and then braze. Of course, the size and shape of the spurs vary according to the taste of the customer. It usually takes me about eight hours to make a pair of spurs, so three dollars is a nice wage if no other work is waiting. The smith should not have much difficulty in disposing of several pairs of nicely polished spurs.

Live for Something.

Live for something, be not idle—
 Look about thee for employ.
 Sit not down to useless dreaming—
 Labour is the sweetest joy;
 Folded hands are ever weary,
 Selfish hearts are never gay,
 Life for thee hath many duties—
 Active be, then, while you may.

Scatter blessings in thy pathway.
 Gentle words and cheering smiles
 Better are than gold or silver,
 With their grief-dispelling wiles,
 As the pleasant sunshine falleth
 Ever on the grateful earth,
 So let sympathy and kindness
 Gladden well the darkened heart.

Hearts there are oppressed and weary,
 Drop the tear of sympathy;
 Whisper words of hope and comfort,
 Give and thy reward shall be
 Joy unto thy soul returning,
 From this perfect fountain head,
 Freely, as thou freely givest,
 Shall the grateful light be shed.



Dividers or tire wheel—which do you use?
 The busy man is seldom the quarrelsome one.

He is usually too late who thinks it's too soon.

Three months to sharpening time and frozen cylinder jackets.

There are 60,000 newspapers published in the world, more than half being printed in the English language.

Among the side lines brought to our notice during the month is undertaking. Do we know about your side line?

Treat your engine like the friend it is and not as so much scrap. Care and attention will make it your best helper.

The lazy days of summer are over and now we look to a busy fall season. How are trade prospects in your locality?

The thoughtful man is respected, the merry man is liked, but much mirth and business success are not companionable.

Paint—would a coat of it improve the looks of the shop or sign? Call on the painter now and have him brighten things up a bit.

That is our mission—to answer questions on vexing blacksmith problems. Don't hesitate to write us on anything that bothers you.

Collections up-to-date? The past season has been a prosperous one to the farmer. Present your bill now, he will pay if he's honest, and most of them are.

A new volume of the journal starts with the next issue. If you were not represented by an article in this volume, send in two now, to make up for lost time.

"Let each one of us get one new subscriber to THE AMERICAN BLACKSMITH and double its subscription before 1906," says a hustling Western smith. Good.

The credit question is a puzzling one. It's hard enough to get a man's order, but it's sometimes harder to get your pay.

Know your man before placing his name on your books.

Don't miss a single issue. If your subscription expires with this number, the last of volume four, then renew immediately. And why not take advantage of the long time rates? See page 221.

"Buying and using well known, well advertised, high grade supplies and advertising the fact, is the reason," answered Thornton when asked how he managed to get such good prices for his work.

If honesty pays and advertising pays, honestly advertising honest values will pay. When advertising something do that something just as advertised. Live up to your advertising,—it gains confidence and confidence begets business.

Don't wait till the snow flies again before calling the first meeting of that association you intend to organize. Make a start now—right now when the roads are in good condition, and you can get the craftsmen together. Write for plans today.

The forge and farm go hand in hand in the development of a country. Smith and farmer are co-workers. Hammer and anvil, plow and reaper, all are brother implements of industry in a common cause—that of building the nation and country upon a rock foundation.

The successful smith is constantly improving his shop equipment. New tools and improved machinery make a prosperous looking shop, will enable you to do better and quicker work, will retain the confidence of your present customers and bring new trade at the same time.

Though cheap in price, expensive in the end is the machine that is constantly breaking down and needing repairs. When adding to your outfit, keep in mind that the best is none too good. Buy well-known goods made by reliable firms. Consult AMERICAN BLACKSMITH advertisers.

A York State horseman offered \$25 to anyone who would shoe his unmanageable iron-gray, but none succeeded in the dangerous job until William Castler with the help of ten men and several heavy ropes came off victorious. The operation took half a day and when offered the \$25 Castler refused it, thinking the achievement sufficient reward.

The Canadian Government has appropriated \$15,000 for making experiments with an electric process of smelting ores and manufacturing steel. All kinds of ores will be experimented with and should the system prove commercially feasible, Canada is looking for the inflow of a large amount of capital and considerable mining development.

A novel outing was that enjoyed by some seventeen hundred persons employed in a large factory of Dayton, Ohio. This army of workers were given a jaunt of nine days on the shore of Lake Michigan. The camp was conducted on the co-operative plan and the entire cost per person, including transportation, use of tent and cot and all meals was but \$7.90.

The supposed oldest horse in Iowa is 52 years old. The animal is in fairly good flesh and is fed on bread baked with an additional ration of sugar each day. It is said that all the signs of great age are present. His coat has not been shed for several years, and his muscles have lost their power to a degree. With all this,

however, he covers four miles of country roads every day, hauling the cream to a creamery, two miles from the farm.

Divide your business into two departments—one for getting trade and the other for getting your money. The up-to-date smith must be a tactful business man as well as a skilled workman. When you consider the large amount of money lost by the craft each year on account of bad debts, you then realize that your collection department needs special attention. What system do you use in following up slow paying customers?

"Have a purpose in life and stick to it. Be sure you're right—that the purpose is worth your effort, that to win is just the thing, and then stick. Live plain, be honest, work hard. Steady work and plain food will keep a man in the path of rectitude when sermons fail, and will contribute not a little to his success. The brain cannot do its best work when sprinkled with the ashes of a dissolute, ill-directed life. Be sure you're right, then stick."

Tom Tardy has changed his mind about working at Panama. We found him replacing his sign over the shop door and questioned him regarding the job on the Isthmus. "It's too much bother," replied Tom. "Those fellows at Washington told me I must get some friends to recommend me and a lawyer to swear that I am in good health and can do all kinds of smithing. But, I don't think Panama is a very good place to live, anyhow." When questioned if he had asked any friends to recommend him, he said: "Well, you see I couldn't exactly find any, they all seemed to be on their vacations." Tom has marked ability along one line, anyway,—that of changing his mind very rapidly.

A Hungarian chemist has discovered a liquid chemical compound which renders certain kinds of matter proof against the effects of time. He asserts that it doubles the density of nearly every kind of stone and renders it waterproof. It imparts to all metals qualities which defy oxygen and rust. It is also a germicide of hitherto unequalled powers.

The professor says that while traveling in Greece some twenty-five years ago, he noticed that the mortar in stones of ruins which were known to be over 2,000 years old was as hard and fresh as if it had been made only a year. He secured a piece of the mortar, and has been working on it ever since until now, when, he says, he has discovered the secret. The compound is a yellow liquid, which the professor has christened zorene.

An interviewer describes the following experiments: A piece of ordinary and easily breakable slag after immersion in zorene defied the full blow of a hammer. Two pieces of steel submitted to an ammonia test equal to five years' exposure to the air emerged from the bath as they entered it. An ordinary table knife which had lain open five months did not show the slightest stain. Professor Brunn asserts that he will be able to make road dust, germ, and waterproof, thus giving a commercial value to hundreds of millions of tons of slag which is now useless in the mining and smelting districts. His discovery will at least double the life of metals exposed to the air, such as in bridges, railroads, vessels and tanks.

American Association of Blacksmiths and Horseshoers.

At this season craft organization is occupying the minds of enthusiastic smiths in various sections of the country, and surely no better time could be selected to join the craftsmen in your locality in an association for mutual benefit and for the general welfare of the trade. Considering the prices of supplies and the high cost of living at the present time, the blacksmiths and wagon builders are justified in demanding better pay for their work. Start a movement for higher prices now while the roads are in good condition, and while it is convenient to attend meetings. Write to us today and we will send you the plans which have been followed with success in all parts of the country, and you, too, by following this outline, and with the aid of a few progressive smiths, can form a strong and

in calling the reader's attention to the accompanying engravings and explanations. It is now known that not only plain bands can be forged from the solid, but also any kind of polygon that is or can be used for a band.

The only objection to rapid work is in correctly estimating the required material and in not having all tools made of the best crucible steel. It does not pay to make tools, such as pins, mandrels and stamping blocks from soft steel, especially if they are used to any great extent. The part of all dies where the pin of the forging works out is the point where the first deformity is noticed, but if care is taken when dressing the fullness of the die (that raise on the inside) so the scale is not injured, the die will not shrink at any of these points again.

Figures 1 and 2 show the shapes of some of the tool steel dies, used in tin-

ber of corners on the band) and then add the whole amount to the volume of the sides. The method in figures is as follows:

$2 \times 2 \times 6 \times 4 = 96$ cubic inches, or amount of stock in corners.

$6 \times 1 \times 8 \times 4 = 192$ cubic inches, or amount of stock in sides.

288 cubic inches, or stock required to forge ring.

Now divide this amount by the cross section of the bar the ring is to be forged from to get the length of stock required. Then punch and round the ring as explained in the July number, leaving it right width, but the corners one-fourth of an inch thicker than they should be when finished. In the same heat square the band; that is, let the band be hit on each side with the steam hammer so as to shape it for the next heat. Now

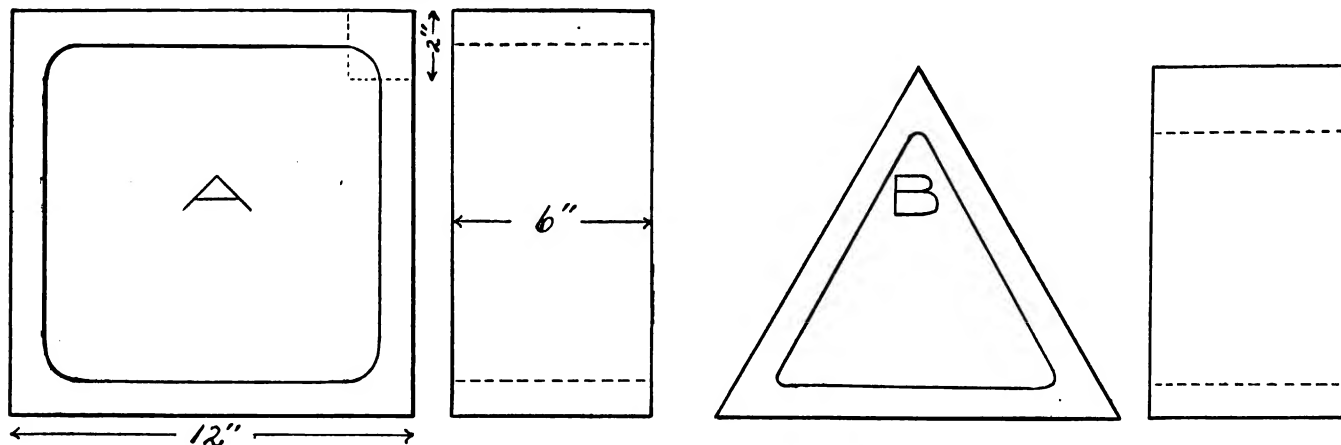


Fig. 1.—THE FORGING OF SEAMLESS BANDS.

beneficial organization. Since the American Association was founded, branch associations have sprung up in all localities and the movement is constantly spreading, for each day the smith realizes more and more the manifold advantages of organization. If there is a blacksmiths' association in your vicinity, tell us about the progress you are making, for we are interested in your success and on the other hand, if the smiths of your locality are not organized, let us help you form the association. Address P. O. Box 974, Buffalo, N. Y., today, and by return mail we will send you plans and give you full particulars.

More Upon the Forging of Solid Bands.

C. H. RICHARDSON.

In the July issue of THE AMERICAN BLACKSMITH, plain bands were spoken of only, and not wishing to leave the subject till all the different shapes had been explained that can now be forged beneath the hammer, I take pleasure

can factories, before the dies are welded on the plates of iron which act as backs or flanges to hold them to the presses. A square band with heavy corners that will be scalloped out in the machine shop is shown at A, Fig. 1. All of the bands are first forged round, as spoken of in the July number. The round mandrel, however, is replaced by a flat one and on this the sides are drawn.

The plan to ascertain the amount of material required to forge A, Fig. 1, is the same as in all cases of solid forgings. Finding the amount of material in the straight parts first gives us a straight length from X to Y of 8 inches long by 6 inches wide and 1 inch thick. The band being square, the sides, of course, are equal, therefore, we have a volume of $6 \times 1 \times 8 \times 4$, or 192 cubic inches in the four sides. The corners, as the dotted lines show, appear as a 2-inch square surface. The area of this face multiplied by the thickness of the band will give the volume of one corner. This multiplied by four (the num-

ber of corners on the band) and then add the whole amount to the volume of the sides. The method in figures is as follows: $2 \times 2 \times 6 \times 4 = 96$ cubic inches, or amount of stock in corners. $6 \times 1 \times 8 \times 4 = 192$ cubic inches, or amount of stock in sides. 288 cubic inches, or stock required to forge ring. Now divide this amount by the cross section of the bar the ring is to be forged from to get the length of stock required. Then punch and round the ring as explained in the July number, leaving it right width, but the corners one-fourth of an inch thicker than they should be when finished. In the same heat square the band; that is, let the band be hit on each side with the steam hammer so as to shape it for the next heat. Now

reheat and draw the sides, being sure to have the mandrel narrow enough so it will not break down too much stock; in this case $2\frac{1}{4}$ inches wide. As the sides lengthen a wider mandrel can be used to finish the work on. The corners will also need some dressing, and to do this replace the round mandrel and set the band on it with the corner up. Then with a handy V-shaped tool, set on top of the corner, force it into shape.

The same plan is used with A, Fig. 1, excepting that just before the sides are drawn the round ring is placed in a large V block and struck a blow on each side to give it the triangular shape it should have before the sides are drawn. By following this plan there is material enough left in the corner to finish them as previously spoken of.

The ring at C, Fig. 2, is a different proposition. To find the circumference of the ring, find the difference between the circumference of the edges on each side and add one-half of this product to the smaller diameter, this gives the

size at the center of the band. Now multiply this by $3\frac{1}{2}$. This will give the circumference of the band. This answer should be multiplied by the cross section of the ring to ascertain the volume of the piece to be made. Working on this rule we get the following in figures: C, Fig. 2, shows that one side of the band is 10 inches in diameter, while the other is only 8. The difference in this case is two inches, so the half of this amount added to the size of the smaller side, gives us a band 9 inches in diameter. This plus once the thickness of

BLACKSMITH on this work and which in conjunction with the foregoing will, I think, give all the necessary information on the making of weldless bands.

High Speed Steels and Their Treatment.

W. P. WOODSIDE.

The mode of treating high speed steel looks strange to the steel worker who has learned to be careful regarding heats. It goes directly against what he has been taught, but nevertheless it does the work.

Regarding the treatment of high

air; I got very good results both ways.

Now take this high heat; it seems quite an easy matter, but I have found it takes a little practice and some good judgment to do it satisfactorily. I believe most of the trouble lies in the smith taking this high heat too quickly, that is, he gets the end or point of the tool up to a high heat too quickly and does not let the heat soak in or penetrate enough. Therefore, the tool after being ground a few times becomes soft. I have found that by taking the heat a little slower and when it is nearly up

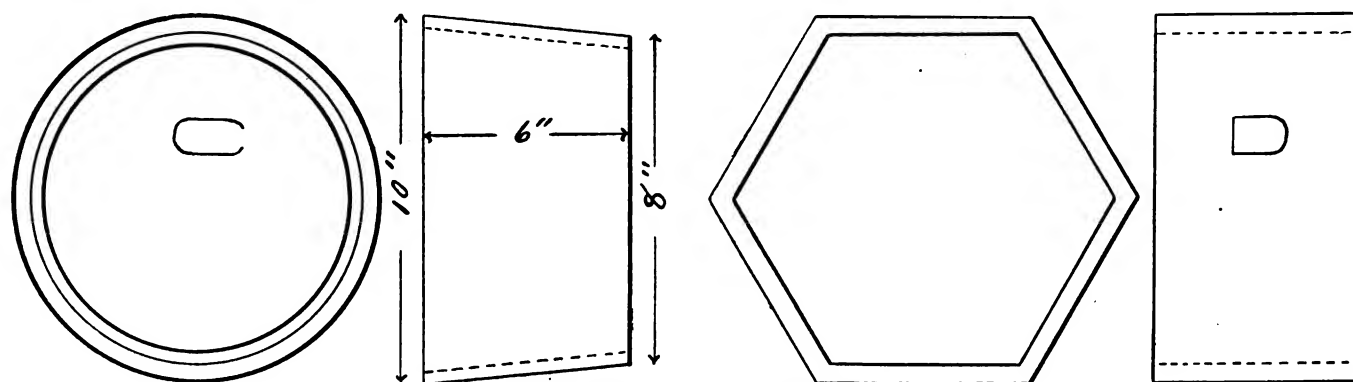


Fig. 2.—THE FORGING OF SEAMLESS BANDS.

the required stock (in this case one inch) times $3\frac{1}{2}$, gives us $3\frac{1}{2}$ inches, or the circumference. The area of the cross section being 6×1 , or 6 square inches, and multiplied by $3\frac{1}{2}$, gives us the volume or 188.25 cubic inches. The next step is to taper the stock before it is punched. An easy way to do this is to cut the ends of the stock square and cool off one end. Then set this cold end on the hammer die and with a thin strip of iron spread out the hot end to the desired taper. Now punch the hole large enough to go on the mandrel. Then reheat your stock and with a liner to lift the mandrel, as shown at R, Fig. 3, draw and finish.

At D, Fig. 2, is shown a hexagon or six sided band. This is forged in the same manner as A and B, Fig. 3. The band is first made round, but is thick enough to forge the corners. It is then forged up under the hammer. Any one of these bands should be forged in from two to four heats of mild steel (from 20% to 30% carbon). The object in forging these bands this way instead of bending and welding, is that when they are machined and ready for hardening, there is little chance for them to warp or crack. The grain is also even—a great help when finishing.

The reader contemplating the forging of seamless bands of any shape had best read the article which appeared in the July issue of THE AMERICAN

speed steel, it is difficult to say just how it should be treated. There are so many different makes and each varies just a little in its mode of treatment. At least that is how I have found them and I have worked Novo, Blue Chip, Rex, Trinity True and Jessops and I found they all had to be treated just a little different. The Novo, Blue Chip and Trinity True, found the hardest

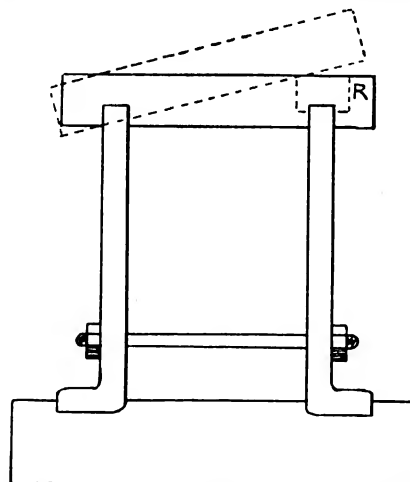


Fig. 3.—SHOWING TOOL USED IN FORGING BANDS.

to forge, while the Rex and Jessop forged quite easy. The Rex and Novo I found gave the best satisfaction when I hardened them in the air. The Blue Chip was best hardened in oil. The Trinity True gave best satisfaction when hardened in warm water (nearly boiling). The Jessops hardened either in oil or

to the right stage shut off the blast a little and let the heat penetrate a little, therefore hardening the tool further, it no doubt gives more wear before having to be hardened.

I give my method of giving the high heat used on Rex, Jessop and Blue Chip. I have my fire built up with coke and covered over either with fire brick or an arch built of green coal. I place the tool in the fire nose down, and turn on the blast gently until the tool shows red hot. I then force the heating up to very near the desired point, which you will know by the presence of a scum or big bubble that seems to form on the point of the tool. Now shut the blast off a trifle and let the tool soak for a minute or two, then turn on the blast and heat the tool until the bubble seems to disappear. In taking this high heat do not let the nose of the tool touch the coal after it gets near the bubbling stage or the point will waste off. If you keep it from touching or resting on the coals you will find it will stand a very high heat without wasting away very much.

For the steels hardened in oil, I use raw linseed, beeswax and resin, three ounces of resin and five ounces of beeswax being used to one gallon of oil. Plunge the tools in and leave until cool. I have also had very fine results with kerosene, but this oil is rather dangerous and if used, the pot or can it is in should be supplied with a lid with which

to cover it as soon as the piece is dropped in. Using the kerosene, the piece is thrown right into the oil and left there until entirely cool. With the linseed oil the tool may be plunged into the oil until the red part is covered and then moved around until it is well cooled. Then drop it in until entirely cool or nearly so.

In making lathe tools out of high speed steel use a good high heat in forging and heat often. Don't try to work it at a dull red for you will spoil the piece when cutting with a hot chisel. Use a high heat or the piece will tear off. I have spoiled tools by turning when the

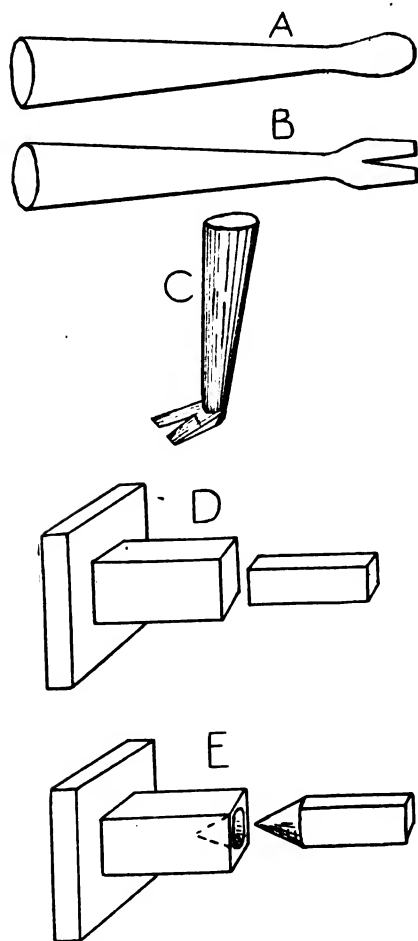


Fig. 1.—SHOP KINKS FOR THE RAILROAD SMITH.

heat was dull red. A piece tears out leaving a hole in the tool which of course would mean do the work over again. It is not advisable to forge a diamond point or round nose tool of these steels in the same style, as crucible steel makes the easiest tool to forge and is strongest when finished. To anneal any of the air-hardening or high-speed steels, put the piece to be annealed in a piece of pipe filled with lime. Screw a cap on each end of the pipe and heat the whole thing until it is a bright red. Then bury in slacked lime until entirely cool. Take sufficient time to heat the piece according to its size. I have

annealed $\frac{3}{4}$ by $1\frac{1}{2}$ -inch air hardening steel this way and it drilled quite easily. I do not use quite as high a heat on Novo or Trinity True as the other brands mentioned, but just so the heat resembles a borax heat for welding. Use the same plan of letting the heat soak.

Several Shop Kinks for the Railroad Smith.

C. C. HENDERSON.

Around the car yards there is a great call for tack pullers, as the inspectors do not like to carry tacks in their pockets, so they resort to a tool to take the old ones out of the cars and use them. I make them as shown in the engraving, Fig. 1, A, B, C. Take a piece of $\frac{3}{4}$ or $\frac{1}{2}$ -inch round steel and draw down one end so that it is about $\frac{5}{8}$ of an inch round. Then flatten this end and cut the claw. Bend the claw a little and you will have a tack puller at one end and a hammer at the other of your piece. Make it about three inches over all.

A great many stems are broken off the buffers on passenger coaches and I have had good success repairing them this way (see D and E, Fig. 1): Take a punch and drive it into the square stem, point the small stem as at E and then weld in the fire.

At one time I worked in a car shop where they had a great many arch bars to repair. These nearly always broke in the bend. The foreman always had the men weld on a new piece, cutting it in the middle to make two bends. But one day a hurry-up job (a thing seldom seen in a railroad shop) came in and it was given me to do, so I put the old fashion dutchman in and sent it out. I first straightened it out, put the bar in the crack, placed in my dutchman and welded up. Then I took a good slow heat and caught all the scarfs. Then with a wash heat I bent it back to shape. When you bend it you squeeze the dutchman into the old break.

How many blackmiths' have a pair of large dividers that are pleasing to the eye? I have noticed that a buggy top joint makes the most of them. Try the plan as shown in Fig. 2, and see how you will like them. Any one can make a neat divider like this with little work.

Thornton Talks on Side-Lines.

In reply to our question, "Why do you carry side-lines?" Thornton said, "I have always paid a good deal of attention to what my customers want, and the carrying of small wares, as I call them, is a source of profit to me and a convenience to my customers. How did I get started? Well, it's quite a time ago, happened when I was still in

the old shanty. A man was having his horse shod and inquired if I sold whips. Of course I had to say no, but you may be sure I secured a small supply at the first opportunity. I built a rack for them near the door and placed a neat sign in a prominent place calling attention to the fact that I sold *good* whips. And right here is a point—if you cannot carry a first-class line of goods you cannot hope to build up a permanent trade in any line. You will notice that the goods I carry are all well known, well advertised brands. But to resume, I first put in whips and then axle grease and so I kept on until now I carry quite a complete line of miscellaneous horse and wagon furnishings. True, some things don't sell as quickly as might be wished, but as long as they are not

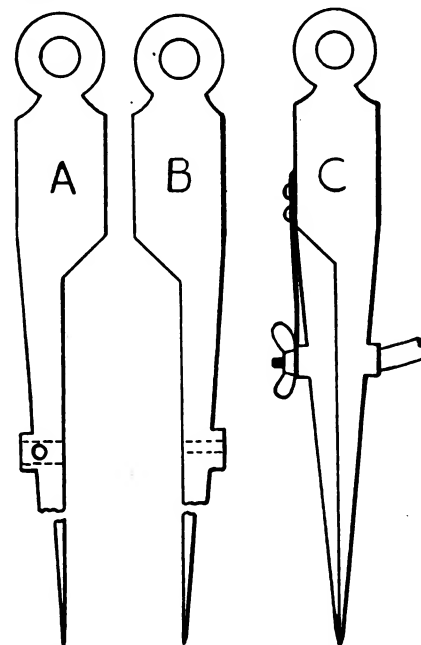


Fig. 2.—SHOP KINKS FOR THE RAILROAD SMITH.

in the way and you don't immediately need the space they occupy, they prove quite a good investment when sold. Beside these little lines, I also act as an agent for many of my customers, buying a blanket or robe, sometimes an entire set of harness or even a horse for them. Many believe that, understanding such things as I do, I know better than they, how to buy and where to get the proper goods.

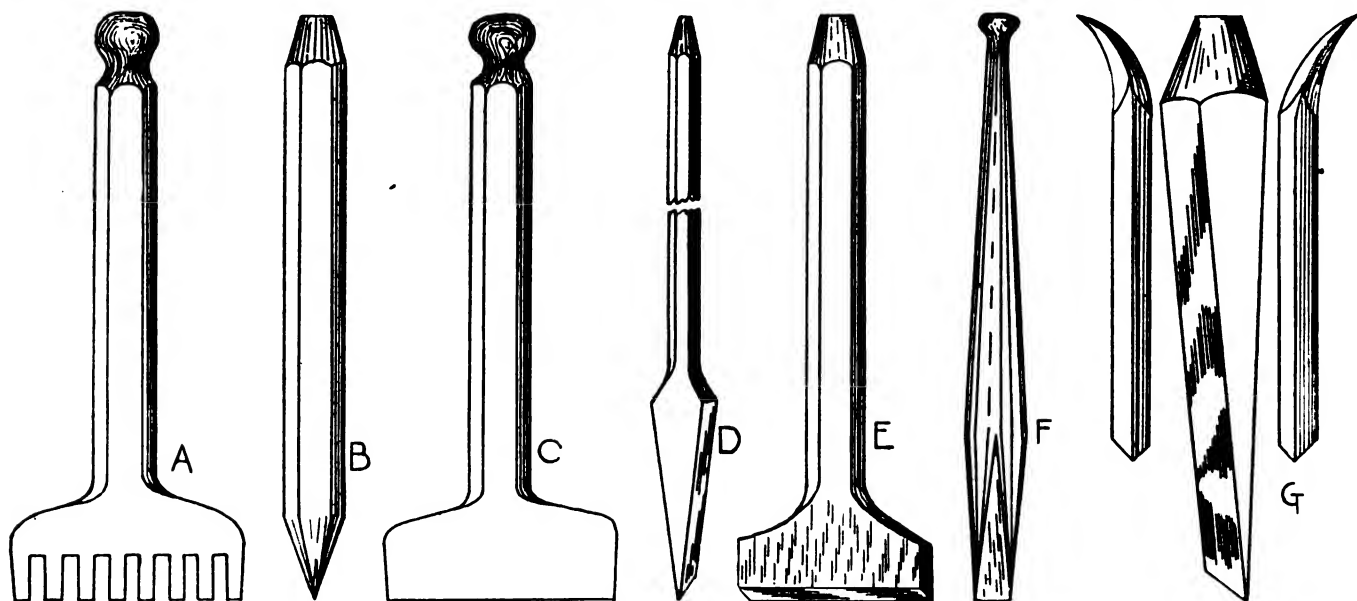
"Another important point is the way you keep your goods in stock. Not many men like to purchase an inch of dust and dirt with a pail of axle grease or a package of condition powders. Nor do they want to get a quarter pound of drill cuttings or rasp filings with each pound of nails. I had the wood worker build a chest of drawers and a cabinet of shelves in which to

place my goods. The shelves have neat glass doors and the package goods, such as axle grease, horse remedies, patent food, harness oil and dressing and also curry combs and brushes, are displayed here. The bulk goods, nails, spikes, nuts, bolts and such things, are kept in the drawers. This way everything is kept neat and clean and the customer is not afraid of purchasing his supplies at the smith-store as I advertise it. In this connection it occurs to me"—and Thornton launched into his ideas on advertising, but we will give these at some other time. Thornton's ideas on advertising are very original and our readers will do well to imitate some of his schemes for winning trade. His shop is seldom without a good sized job and believing as he does in keep-

the teeth sawed in by a steel disc attached to an emery wheel, and third, the teeth may be cut by hand. The hand method is as follows: After the chisel blanks are forged to the width desired, they are allowed to cool and are then dressed upon an emery wheel, or grind stone. The spaces for the teeth are then filed, usually six to the inch, for soft stone. All that is necessary is to file the spaces deep enough on each side so that when the tool is heated the spaces marked will be a guide by which to cut. Now draw two or three chisels down very thin and square them at the point. These we will use to cut the teeth. Now heat your chisel blanks slowly. When hot put them in a vise clamp and with one of the prepared chisels drive down in the spaced tooth

in the preceding paragraph. Now when the saw is running at a speed usual for your emery wheel, you will find that the steel disc will saw out the spaces nicely and very fast. When you are through sawing, finish up the tools as already described. As to machine-made teeth, a machine on the principal of a punch and shear is used to punch the teeth, and you finish up just the same as the hand cut or sawed teeth. I find, however, that the cold punching process tends to crystallize the teeth and they are not as strong or durable as the hand cut or sawed teeth.

Now as to the temper. Here you must exercise the utmost care, as success depends largely on the tempering. Have a tub of clear, soft water; if you have no soft water add salt to the



VARIOUS STYLES OF STONE CUTTERS' TOOLS.

ing his men always busy, Thornton makes a practice of working like the traditional beaver in soliciting trade and getting new work.

Making and Dressing Stone Cutters' Tools.

J. C. LAMONS.

I will endeavor to give a method of making and dressing stone cutters' tools as used in this locality for cutting and carving Indiana oolitic limestone. The stone cut here is not as hard as granite nor is it as hard on tools as sandstone. So perhaps the method of tempering which we use here would never do on sandstone, granite or hard limestone tools. However, the method of making and dressing would be the same. In dressing and making a tooth chisel, three methods can be used as follows: A machine cut tooth, i. e., a machine having a punch and die formed to punch the teeth; second,

to the proper depth, which is about $\frac{1}{4}$ of an inch. If your cutting chisel is properly made it will cut out the gap very nicely. Keep the cutting chisels well oiled with some kind of heavy oil. We use axle grease, which keeps the tool cool and prevents it from hanging and also for drawing the temper. Always cut from the middle towards the edges. After all teeth are cut, allow to cool and then file out with a small knife-file to the proper shape which is determined by the nature of the work. If the stone is soft the teeth should be fine and if the stone is hard the teeth should be blunt.

To saw the teeth with a steel disc, get a blank circular saw 10 or 12 inches in diameter and 1-16 of an inch thick. This is put on the spindle of an emery wheel. The same operation as to manner of spacing teeth, etc., with a file is now gone through with as described

water and then heat it. Never use cold water. Now heat your finished tools very slowly to a dull red, or a "cherry red," as it is commonly termed. Care must be exercised so as not to heat too rapidly. Now cool the chisel, polish quickly and watch the color run down to the point. You will find that the middle teeth want to run down faster than the edges. To overcome this, cool middle by applying a small bunch of wet waste. This keeps an even temperature and allows the color to run to the point evenly. Now when you have a pale blue at the point, plunge your tool into bath. If you have been careful to heat slowly and to draw temper evenly you will find the tools will rarely break and will give entire satisfaction to the stone mason. I have described only the method of making and tempering tools as used on soft stone. For granite, marble and

other hard stones you have to make them stiffer. The smooth chisel and carvers' tools I temper to a straw color. A carver uses a small mallet and his work is not as heavy as general cutting, so his tools do better when left hard.

One may not have a shop equipped with power, emery wheels, etc., so would have to file the blanks into shape. When this is the case always file in the direction of the teeth, dress down to proper thickness and then finish up on a grind stone. Of the three methods described in making a tooth chisel, the disc sawing method gives the best satisfaction, as it does not spread the teeth and is also the fastest way. The accompanying engravings will give the reader some idea as to the shape of the tools used by stone cutters. As already described, A is a mallet-head tooth chisel; B, a hammer-head point chisel; C, a mallet-head plain chisel; D, a splitter; E, a pitching tool; F, a drill, and G a wedge and feathers.

An Old Established Wagon Shop of York State.

In 1839 Peter C. Hanford located at Unionville, New York, and started a wagon and sleigh making shop. They hewed and dressed all their spokes by hand, and turned and mortised their own hubs. The present owner of the shop has a few of the latter now which were gotten out prior to 1860. In 1856 he put in an endless chain, one horse power, which ran a buff and gig saw, a turning and boring lathe, a grind stone and a drill press for

washing and mending and \$50 per year. At the end of four years he was given time and material to make for himself just as good a buggy as he could. After finishing his time he went to another shop for three years and then came back and worked continuously at the Hanford shop till 1904, doing about forty-five years of work for the same people. In 1860 the elder Hanford enlarged his establishment by putting up several new buildings in the rear of the original shop and kept adding to them as needed. One son, N. C. Hanford, learned wood working and painting; another son, J. H. Hanford, blacksmithing, and the third son, E. M. Hanford, wood working. These three sons at the outbreak of the civil war, enlisted. In 1862, P. C. Hanford took into partnership his son, N. C. Hanford. They bought out the local undertaker and added that to their other business under the firm of Hanford & Son. In 1865, J. H. Hanford was admitted as a partner. In 1879, P. C. Hanford died, and the firm became Hanford Bros. Just previous to this time they adopted a rule of terms by which 10 per cent. discount would be given on all bills of repairing if paid for when work was done. This rule worked well and is still in force. In 1896 the undertaking business was sold. In 1900, N. C. Hanford died. The business then came into the hands of J. H. Hanford, the present owner, who is still very active in his department.

This business has been in the family

has about 500 inhabitants, and J. Harvey Hanford has the distinction of having lived in it longer than any other person.

An Original Shop Sign.

The craftsman without a sign over his door misses the business that would otherwise walk into his place. The necessity for a shop sign is apparent to



AN ORIGINAL SHOP SIGN

every progressive smith, and when the sign is different, out-of-the-ordinary, its value as a trade bringer is increased many times. Every shop owner can have a sign that is distinctively his own. It need not be of a style verging on the sensational, although this may be permissible in some localities, but the sign should be one that attracts attention and must be kept in good condition.

A sign recently brought to our notice is shown here, and is not only an example of originality in shop signs, but in skill and artistic ability as well. The owner of the sign, Mr. George Palmer, is also its maker, having executed the piece of work in its entirety. The sign is valued at \$50.00 by its owner, and was made entirely in his spare time. "This sign has attracted much attention," says Mr. Palmer, "and my brother smiths here were much surprised when I hung it before my shop."

The Shoeing of Laminitic Feet.

E. W. PERRIN.

The shoeing of laminitic feet, commonly known as foundered, pumiced or drop-sole, frequently proves a difficult problem for the average shoer, but since the principal difficulty is the result of ignorance on the anatomy of the foot and the pathology of laminitis, another article on the subject may prove of service. Laminitis is an inflammation of the sensitive laminae of the foot, it may be acute or chronic. It is most frequently met with in the



A WAGON SHOP ESTABLISHED SIXTY-SIX YEARS AGO.

the blacksmith shop. In those days they worked from 6 a. m. to 9 p. m., using tallow dip candles when sunshine gave out. A good many young men were taught their trade by Peter C. One of them, Joseph D. McCoy, began in 1855 receiving, as usual, board,

for sixty-six years at the same place. Everything in the shape of repairs is done, except horseshoeing. There are many wagons owned in the vicinity doing every day duty that were made prior to 1860. There is no other wagon shop within eight miles. The village

acute form though it may develop slowly. I have known some horses to develop a laminitic condition of the front feet without being lame enough to lose a single day's work.

The most prolific cause of laminitis—founder—is inflammation of the mucous membrane of the bowels or lungs. A horse may get inflammation of the bowels from drinking very cold water while overheated or as in the case brought to a local veterinary surgeon, where a horse got into a feed room and ate about three bushels of oats. It took prompt treatment to save the horse's life, and as soon as the acute symptoms of inflammation of the stomach had subsided the animal developed laminitis. The sensitive laminae is a continuation of the mucous membrane of the pulmonary and digestive organs, and experience proves that inflammation in the one organ is very prone to

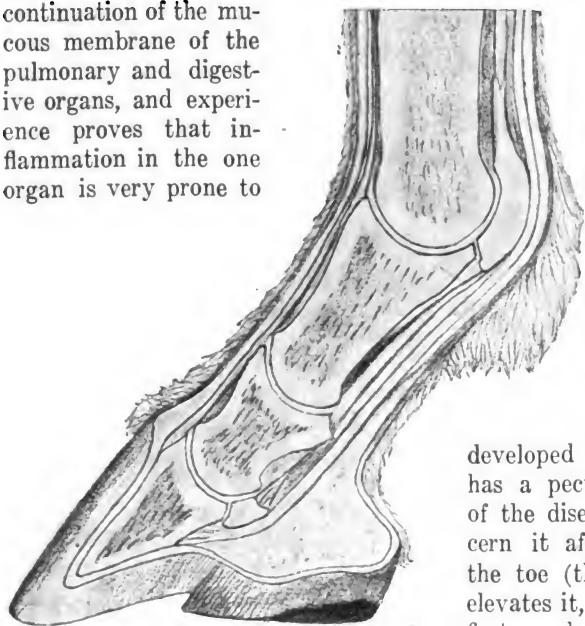


Fig. 1.—SHOWING THE HEALTHY FOOT.

spread to the other. We, therefore, frequently see laminitis as an after effect of pneumonia, enteritis or a protracted case of colic, or it may result from a long journey on a hard road, especially if following a period of idleness. The coarser breeds of horses with heavy lymphatic bodies are more prone to the disease than finer bred stock.

The symptoms of acute laminitis are very characteristic. The animal stands with the hind feet well under the body, while the front legs are extended. The toes of the feet are elevated and the heels only touch the ground. This peculiar position is the result of an effort to get the weight of the body off the front feet as much as possible. There is also a high fever with a quick pulse, and the face is expressive of great suffering. The body is bathed in profuse perspiration and the slightest tap on the affected feet causes great pain.

Of course, the treatment of such cases requires the professional skill of the veterinarian and my reason for giving an outline of the pathology of the case, is because it is necessary to the shoer in the after treatment to which he will be called when the surgeon has cured the acute symptoms. During the progress of the disease the congested laminae, see Fig. 1, exudes serum around the toe. The unyielding nature of the wall does not admit of any swelling that would relieve the intense pain, thus the pressure of this exudation separates the sensitive from the insensitive laminae and forces the coffin-bone downwards. This causes the structural changes in the foot, as seen in Fig. 2. In a few bad cases the toe of the coffin-bone is forced through the horny sole of the hoof. As an after effect of this serious disease the sole of the hoof becomes flat or even convex. The growth of wall from the coronet is slow, while the growth of soft horn from the sensitive laminae is excessive. The foot grows hardly any heel, while the toe is abnormally long, as seen in Fig. 2. The outer wall grows irregular rings, and there is an abnormally

developed frog. The laminitic horse has a peculiar gait so characteristic of the disease that horsemen can discern it afar. In an effort to save the toe (the injured part), the horse elevates it, sets the heel on the ground first, and walks in a heel and toe fashion. Those animals that have had severe attacks are fit only to plow. I have seen some where the coffin-bone protruded through the sole, that they had to be destroyed. But it is truly wonderful what a marked improvement will result from proper shoeing, and this is why I have taken the space to elaborate on the causes and symptoms of the disease, believing, as I do, that a knowledge of the same is indispensable to the correct shoeing of such feet. It is common to see the shoes of laminitic feet worn off at the heel, while the toe is almost as thick as when the shoe was put on. This heavy wear at the heel is the result of the animal trying to save concussion on the toe (the seat of pain). This undue concussion at the heels impedes the growth at that part and as a result the heels of such feet are very low, but the frog grows abnormally high. Here is where scientific knowledge comes in. The

unscientific shoer thinks that the tenderness is in the frog instead of in the heels and the sole. So to keep the frog off the ground he uses high heel calks, which imposes great weight on the

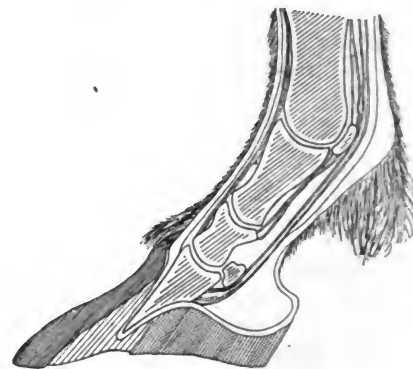


Fig. 2.—SECTION OF LAMINITIC FOOT SHOWING DEPLACEMENT OF THE OS PEDIS OR COFFIN-BONE AND SUPERABUNDANCE OF HAIR AT THE TOE.

tender heels, and by thus elevating the heels of the foot, he throws the weight of the horse on the toes, adding greatly to the discomfort of the animal. I have taken many such cases rendered almost useless and made them fit for work by scientific shoeing.

Do not try to raise the heels to the normal height of a sound foot, the heels of laminitic feet are naturally low. You will observe in Fig. 2 that the sole is very thin. Don't make the mistake of paring this away or you may cut it through. As a rule, there is little or nothing to cut off the wall at the ground surface, but the toe will need rasping back at each shoeing. The correct way to shoe laminitic feet is with bar shoes and leather or rubber pads. If the feet have been shod with high heels for some time the heels of the feet will be low and the frog high. For the first shoeing,

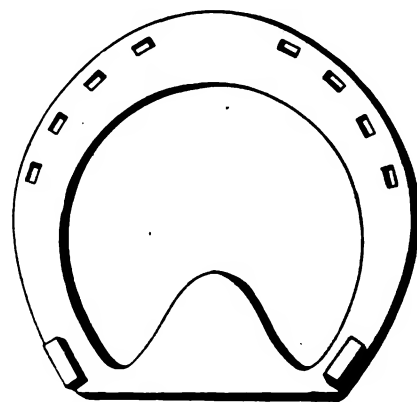


Fig. 3.—THE PROPER SHOE FOR LAMINITIC FEET.

arch up the bar of the shoe and weld a slug on each heel. Put plenty of nail-holes all around the shoe—toe included—seat out, concave the shoe so that the tender part of the sole is relieved of weight. Then roll up the toe of the

shoe and fit the shoe so as to get but little weight on the frog, because this organ, being so long deprived of its natural function, will stand but little weight at first. At the next shoeing you will find that the heels have begun to grow, while at the same time the frog has begun to sink back to its natural position. At the third shoeing you may put equal weight on heels and frog, and as you lower the bar at each shoeing, hammer the slugs lower at the same time. When the frog has sunk back level with the heels, leave the slugs off altogether, as all laminitic horses travel with much more comfort without calks. In some cases it may be necessary to weld a plate across the shoe to protect the sole from injury by the projections in the road. Always use leather soles with tar and oakum. In shoeing an animal that has only just recovered from an acute attack, don't be disappointed because the improvement is slow, it takes time for nature to complete her repairs, but by carefully following the instruction you may make a good worker of many a horse that is otherwise useless.



Here will be found brief anvil jottings, hints from far and near, shop methods seen or suggested.

When knife blades are hardened in water, draw the temper to a purple; but if hardened in oil or grease, draw the temper to a straw color.

Putty which has laid about the shop and become hard can be softened for use by pounding it with a hammer on a hard, smooth surface until it is quite fine, then add a little linseed oil and work the mass with the hands.

One of our West Virginia friends sends in the following formula for a welding compound for springs: Burn a quantity of borax and pulverize it well, then mix one ounce of the borax with two ounces of beeswax and from one to three ounces of resin. This is used the same as plain borax.

The following rule for estimating the amount of paint required to cover a given surface is recommended, and as many smiths paint their own shops, it may prove of value. Divide the number of square feet of surface to be painted by 200. This will give you the number of liquid gallons for two coats.

The boy was trying to weld some steel the other day, but as his blows were too light the boss administered the following: "Don't be afraid to use elbow grease. A hundred light blows will never make up for a few quick, hard ones. If you cannot strike a good, hard blow that will do some good, don't strike at all, but just stand and

look at your work; you will do just as much good, and not waste strength."

The woodworkers use the following simple method for removing an occasional splinter from their hands: Fill a wide-mouthed bottle nearly full of hot water, care being exercised to avoid cracking the bottle. Then place the part of the hand containing the splinter directly over the mouth of the bottle and press lightly. The action of the steam upon the injured part will draw out the inflammation and in a minute or two the splinter of wood.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

The Best Tool Steel.—Some one asked about high speed tool steel. I would say that I like "Novo" best of all. It is just as easy or easier to work as common crucible steel, for you can't burn it. Heat till it blisters and cool in oil. R. E. STEPHENSON.

Curing the Hoof Cracks.—In answer to Mr. C. D. Beaven's query how to cure a crack in horses' hoofs, will say, take a knife and pare out side wall of hoof about half an inch wide on each side of the crack. Then fit the shoe so that the foot will not have any bearing on the shoe where the crack is. This never fails to cure the worst cases of cracked hoofs. W. B. KIRKER.

Soft and Spongy Feet.—What is the best thing to do for a horse's feet when they get soft and spongy? I would like also to know what is best to use on carriage work, raw linseed oil or boiled oil? I ask that, as I heard some painter say that boiled oil was best and others would say that the raw oil was best. Also what is the best lead to use in mixing paints? THEODORE MELANCON.

Treating Sick Animals.—Brother J. M. Drew in his "Random Remarks on the May issue," remarks about my statement "anyone may do it." Of course anyone may do it, but the man who wishes to treat horses must study. I have spent many hours at night and at spare time studying anatomy, physiology, materia medica and surgery. No one will be a blacksmith unless he learns the trade thoroughly. FRANZ WENKE.

The Best Make of Blower.—I have had many years' experience with the bellows and many kinds of blowers at many kinds of work. A poor blower is worse than the old bellows. The class of blowers that have ball bearings and are driven by a crank through spiral-cut gear are good for light work, but for all kinds of forging, light and heavy, I found the other kind of blower to be the best. E. R. LANGFORD.

What is This?—I have been at the business eleven years. Have studied it and had experience in several States, but I have a piece of metal that is very peculiar. I got it for tool steel. It breaks like tool steel when cold, like iron when hot, and hammers like very soft machine steel, but it won't harden. When turned with the best red prussiate of potash, it seems to make it

softer and it can be cut with a knife after cooking. R. E. STEPHENSON.

To Measure Wheels and Tires.—Drive a chisel in the joint of the wheel, then opening compass 14 inches, set one end against the chisel and mark wheel with the other end. Now measure the wheel from the mark to the chisel. This leaves 14 inches of your wheel measure on your compass. The tire is now marked seven inches from where you want to weld and starting from that mark use the tire wheel, stopping at indicator and marking the tire. The two marks on the tire and the compass points give you the two sizes without changing compass or using the traveler the second time. When dots and point come together they are both the same size. Don't fail to use this quick and correct way of measuring as you will be pleased with it. Y. T. PHILLIPS.

Some Talk on Cold Tire Setters.—I would like to have the subject of cold tire setting discussed by blacksmiths in general. My first experience with a cold tire-setter was some years ago, while working for a carriage company of Hagerstown, Md. They owned a hydraulic machine which worked to perfection on new work, but for old wheels, that had begun to sink between the spokes, it would not work. My next experience was with a hand power machine, which I went two hundred miles to see. I was going to buy one if it worked to my satisfaction, but it took too long to do the work, and it had the same fault as the hydraulic machine. Two brother smiths in my neighborhood have bought edge grip machines, neither one of which will do the work as well as a first-class mechanic. H. L. KIBLER.

Axe Dressing.—I have read the article of Brother P. M. Watt on axe dressing. I agree with him on the heating of an axe, as I have been doing this work for the past seventeen years. The smith should be very careful how he heats steel of any kind, as some will stand more heat than others. I always draw my axe from above where the steel sets in, giving a gradual taper down to the edge. When I get the axe shaped as desired, I lay it down and let it cool. Then I dress it up with a file, re-heat it to a good red (cherry red, as most smiths call it), and then temper it in water. The water should be luke warm to allow the temper to run. When the axe turns blue, I dip it in water just enough to check the color. Now I brighten with a file and run again. When the axe gets to a gold color, I cool it enough to stop the color and lay it down to cool gradually. I always leave the axe so that a good file will cut it. H. E. WHITE.

How to Cut Iron.—Here is a good way for the man who has a steam hammer and no shears to cut iron. Place the bar to be cut on the hammer-anvil with a piece of steel, about the same thickness as the stock to be cut, under the mark where the iron is to be cut. Now place another piece on top of the iron to be cut, just so it will clear the one on the bottom. A smart blow will now clip off the stock as if it were cut by a pair of shears. In fact it will cut better, as there is no squeezing as in the shears. The edges will be square and clean cut. Round iron can be cut in the same way, except that a bottom tool like a swage with no shank is used to lay the iron in and one with a handle is used for the top. I cut flat iron up to five inches wide and $\frac{3}{4}$ -inch thick, and round stock up to $1\frac{1}{2}$ inches. Care must be taken to keep the edges of the cutters clean and sharp. Do not let them get rounded off, as in that case they will tear the stock and not cut it. H. N. POPE.

The Question about Cutting Stock.—In answer to John Padberg as to length of stock for a ring five inches inside diameter of one inch stock, Mr. D. S. Crowe submitted the following as his method:

5 x 3 + 3 x 1 or 18, adding $\frac{1}{4}$ -inch to the foot, or $\frac{1}{4}$ of an inch gives him 18 $\frac{1}{4}$ inches. My method is as follows: 5 inches plus one inch of stock or six inches; this multiplied by 22 and the result divided by seven gives us 18 6-7. On a three foot ring inside of two inch stock: By Mr. Crowe's method the answer is 10 2-4 inches, and by my method 9 feet 11 $\frac{1}{4}$ inches.

I have used my method for forty years and thousands of times, and have never yet found it wrong. If the ring is to be made to the inside diameter, then add once the thickness of the stock or rather the width of the bent surface to the diameter. If the ring is to be made to the outside diameter then subtract one thickness from the diameter, then multiply the result by 22 and divide by seven.

J. A. SCHULTE.

Some Prices from California.—I send a few of the prices we receive here for our work:

Horseshoeing, four shoes.....\$1.50
Tire setting, from.....\$0.75 to 1.00
Sharpening plow shares......25
Pointing plow shares......75
New spokes put in......25
Norway chain links for hay press,
from.....\$0.50 to 1.00

My shop is 40 feet long and 32 feet wide. I have a five horse power Pacific gas engine, and run a power hammer, a drill, an emery wheel, a blower, a pump, a lathe and a circular saw. I intend to get a band saw soon. I find it pays to have power, as a smith can do his work better, quicker and easier, and it stamps a smith as progressive. Brother smiths, be progressive and get yourself an engine and take THE AMERICAN BLACKSMITH.

F. G. MOITROZA.

Another Method of Treating Toe Crack.—I have noticed in the July number that Mr. C. S. Beaven desires to learn some method of treating a center crack, or, as he terms it, a "toe crack." I also notice in same issue T. A. B.'s method. While T. A. B.'s method is feasible, and in many cases correct, there are center cracks that will not admit of sewing up with nails on account of a depression along the line of the crack caused by not treating it in time.

I give my method of treating a center crack, and in nearly all cases find this method of treatment very good. Of course, I sew up the crack when possible to do so. Ordinarily I use a plain bar shoe, clipped at the toe on each side of the crack. I pare across the crack to free from bearing on shoe and also pare a groove the whole length of the crack. I then cut across the top of the crack and fire same with any sharp edged tool. This is to separate the hoof from the flesh and start the hoof to growing downward. It will do this if the hoof is kept pared across the crack at the toe, so as to relieve all the pressure on the hoof.

GEO. F. WHERRY.

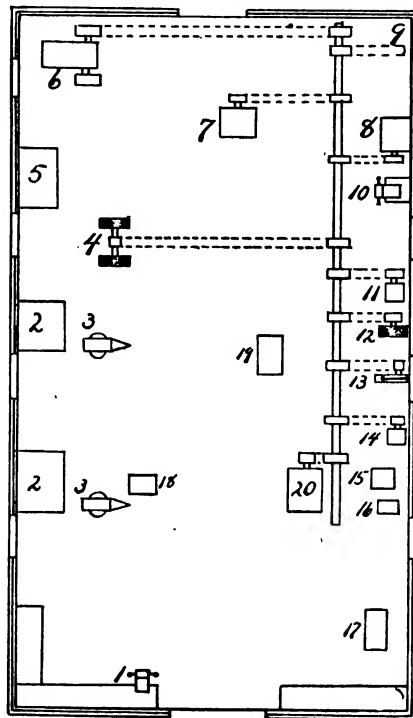
An Interesting Letter from West Virginia—I have worked at the blacksmith trade for twenty-three years but never had to make a plow share. The plows used here have ready-made points which are sold by all dealers in hardware. I have made all kinds of shovels and cultivators of steel, and in fact have made everything that is used in the way of farm implements. When I began to work at the trade we had to make all our own horseshoe nails, as the ready-made nails were hard to get and cost from 25 to 40 cents a pound. I make and weld all kinds of springs. Any kind of spring is easily tempered if you know how. I depend on the fire and the different ways of drawing the temper to a spring. To weld a buggy spring or a round spring use borax, beeswax and English rosin. Burn the borax and pulverize it well. Then mix the borax with two ounces of beeswax and one to three ounces of rosin. Now take the broken

spring, shave it a little thinner than it was and bend it a little at point to be welded. Do not scarf any at the point but bend similar to a scarf. Then put it in a clean fire and heat just under a white heat. Then place it on the anvil and weld to a finish at one heat. I weld any axle at one heat, and weld square every time. No man can see where they go together and so it should be with springs. I have now in my shop a spring of that kind. I did this when I was experimenting.

J. D. SKIDMORE.

A Texas Shop With Power.—The accompanying engraving is a plan of my shop. 1 represents a vise; 2, forges; 3, anvil; 4, emery stand; 5, tool case; 6, five-H. P. engine; 7, band saw; 8, rip saw; 9, wood saw; 10, wood vise; 11, drill; 12, grind stone; 13, blower; 14, Hawkeye power hammer; 15, Stoddard tire shrinker; 16, Reynolds tire bolter; 17, House cold tire setter; 18, swage block; 19, Little Giant punch and shear; 20, power forge.

I also renew my subscription for the AMERICAN BLACKSMITH, which I could not do without. I consider it the most valu-



POWER IN A TEXAS SHOP.

able paper I have ever taken, and do not see how any up-to-date blacksmith can do without it.

There have been a great many smiths asking whether it pays to put in power. My experience for the last sixteen months proves to me it does pay, there is so much work that could not be done without power. In plow sharpening I can do three men's work. You cannot afford to be without power in the shop.

W. H. SCOTT.

An Interesting Letter from Georgia.—My father and I run a general repair shop. He has been in the business for twenty-nine years. When we run out of repair work, we are making new wagons and through the year, by working as we have the time, we complete from six to twelve one-horse and two-horse wagons. We are also in the undertaker business, besides carrying a line of International Harvester Machines and mail boxes. We have a full line of tools, but no power, though we expect to put in a gasoline engine next year. My father has given up shop work to me and does only contracting now. I like THE AMERICAN BLACKSMITH. EUGENE MIDDLEBROOKS.

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Prices Current—Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., August 29, 1906, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

$\frac{1}{2}$ in., round or square, Iron, \$2.80; Steel, \$2.90
$\frac{3}{4}$ in., " " " 2.40 " 2.50
$\frac{7}{8}$ in., " " " 2.20 " 2.30

Flats—Bar and Band.

$\frac{1}{2}$ x 1 in., Iron \$2.80; Steel..... \$2.80
$\frac{3}{4}$ x $\frac{1}{2}$ in., " 2.20; " 2.20
$\frac{7}{8}$ x $\frac{1}{2}$ in., " 2.40; " 2.40

Norway and Swedish Iron.

$\frac{3}{4}$ in., round or square..... \$4.90
$\frac{1}{2}$ in., " " 4.50
$\frac{3}{4}$ in., " " 4.90
$\frac{1}{2}$ x 1 in. 4.80
$\frac{3}{4}$ x $\frac{1}{2}$ in. 4.20

Horseshoe Iron.

For No. 1 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in. \$2.50
For No. 2 shoe, $\frac{3}{4}$ x $\frac{1}{2}$ in. 2.50
For No. 3 shoe, $\frac{7}{8}$ x $\frac{1}{2}$ in. 2.50
For No. 4 shoe, $\frac{1}{2}$ x $\frac{1}{2}$ in. 2.50

Toe Calk Steel.

$\frac{3}{4}$ x $\frac{1}{2}$ in. and larger..... \$3.00
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Spring Steel.

$\frac{3}{4}$ to $1\frac{1}{2}$ in. Rounds. Op. Hearth \$3.00, Crucible \$5.00
$1\frac{1}{4}$ to 6 in. by No. 4
gauge to $\frac{1}{2}$ in. Flats " 3.00, " 5.00

Carriage Bolts. (Net Price per Hundred).

$\frac{1}{2}$ x 2 in..... \$0.54	$\frac{3}{4}$ x $2\frac{1}{2}$ in..... \$0.82
$\frac{3}{4}$ x 2 in..... .58	$\frac{1}{2}$ x $3\frac{1}{2}$ in..... .96
$\frac{1}{2}$ x 3 in..... .62	$\frac{3}{4}$ x 3 in..... 1.81
$\frac{3}{4}$ x 3 in..... .65	$\frac{1}{2}$ x 4 in..... 1.70
$\frac{1}{2}$ x 4 in..... .75	$\frac{3}{4}$ x 4 in..... 2.10

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NIC. KLAUS, Breda, Iowa.

Trade Literature and Notes

THE CHICAGO PNEUMATIC TOOL CO., Chicago, Ill., send us a copy of their semi-annual statement issued to stockholders showing earnings for the half year ending June 30th, 1905. The report is interesting and shows the splendid financial condition of this company at the present time. It might be said that the quality and merits of their products are directly accountable for such success.

THE IMPORTANT DECISION of Judge Ray in the recent patent suit of the Revere Rubber Co. and the Consolidated Hoof Pad Co. is interesting to both manufacturer and consumer. It seems that the decision of the court is in favor of the Revere Rubber Co. and that firm will continue to manufacture "Air Cushion" rubber horse shoe pads, the quality of which has won for them a broad and enviable reputation.

A BOOKLET OF TESTIMONIALS has been received from the Burr Mfg. Co., Kalamazoo, Mich., showing that the Schau Cold Tire Setter is

giving perfect satisfaction to shop owners throughout the States. In the pamphlet this machine is interestingly described, directions for operation are given and price and terms are also stated. Send for a copy.

FREE ON 30 DAYS' TRIAL is the offer made by the E. T. Buhl Mfg. Co. of Cleveland to purchasers of the Reynolds Axle Gauge. After that period, if this gauge has not proved its simplicity of adjustment and accuracy of gauge, it may then be returned at the expense of the manufacturer. Descriptive circulars and interesting price list will be sent free, upon request.

THE STANDARD BALL AXLE WORKS of Lancaster, Pa., announce the opening of their new factory at Elizabethtown, where they are now manufacturing the well known Standard Ball Axles. Recent literature received from this concern tells of the many fine points of these axles and explains why they have become so popular, especially for fine custom work. Wholesale price list sent upon request.

THE HAY-BUDDEN MFG. CO. of Brooklyn, N. Y., inform us that there are now over 100,000 "Hay-Budden" anvils in actual service. In these days of large figures, 100,000 does not seem such an extraordinary figure, but when one considers that an anvil lasts many smiths a life time and that owing to the use of drop forgings, malleable castings and stampings, anvils are not used to the extent that they were years ago, the consumption of these tools is found to be rather limited. These figures certainly speak well for the high quality of "Hay-Budden" anvils.

IN A RECENT CIRCULAR, The New Era Gas Engine Company of Dayton, Ohio, give some interesting figures regarding their engines. The names of fifty firms who are using New Era engines are given showing the size of the engine, number of hours run per day and the cost to operate per month. The above named firm claims that in the saving of fuel and attention, their engines pay for themselves in eighteen months, and the data contained in this circular is interesting to every shop owner. New Era engines are built in sizes from 1 to 100 horse power.

SEE PAGE III FOR SPECIAL BARGAINS offered to the trade by Cray Bros., Cleveland. It might be interesting for our readers to know that Cray Bros. do a strictly mail order business, employ no traveling salesmen and endeavor to give their patrons the benefit of these savings by offering their goods at lowest prices. This firm is now running their own trimming shop and carry a complete line of tops, cushions and all kinds of carriage trimmings. In their own blacksmith shop they build lumber wagon wheels, weld axles and attach rubber tires for their customers. Cray Bros. guarantee to give their customers perfect satisfaction and give purchasers the privilege of returning at their expense any goods not found exactly as represented. They advise that all orders, large and small, receive the best of attention and are shipped promptly.

In a few weeks, Cray Bros. will issue their new fall catalogue with revised prices on a most complete stock of supplies. This catalogue is for the trade only and will be sent to AMERICAN BLACKSMITH readers upon request. Write for a copy now addressing Department B.

GEAR EXCELLENCE!

The Best Design Material Workmanship

O. M. Milk Wagon Gear No. 251

We will exhibit both in New York and Philadelphia, and as in other years we will lead.

Our New Gear Catalogue is now ready for distribution and will be sent FREE to any one.

SEND YOUR NAME TODAY!

SCHUBERT BROS. GEAR CO., ONEIDA, N. Y.

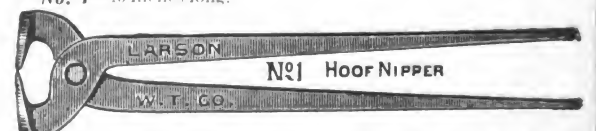


THE W. T. CO.'S. HOOF NIPPER BEATS THEM ALL

THE TWO LEADERS!

No. 12—Hoof Trimmer, 12 inches long, fully polished and packed one in a wooden box.

No. 1—13 inches long.



All our tools are hand made out of tool steel. We will send either size, express prepaid, upon receipt of \$1.25, or both for \$2.25, to any part of the United States, if unable to get them from your jobber.

Address WASHINGTON TOOL CO., Owatonna, Minn.

Manufacturers of the Celebrated Larson Pincers and the No. 12 Hoof Trimmers.

YOUR CHOICE

is here given you of five neat premiums in return for one new subscription to THE AMERICAN BLACKSMITH. Tell your brother smith how well you like the paper, send us his dollar, and get your choice of the premiums, free and sent postpaid.

WHICH ONE DO YOU WANT?

Remit by money order, stamps or registered letter. *If you are not already* a subscriber, send \$1.00 for a year's subscription and a premium.

American Blacksmith Co.—Box 974—Buffalo, N. Y.

1. This hoof knife is made of refined crucible steel, carefully tempered. It is a high-grade, serviceable knife, with Heller Bros.' reputation back of it. Cut shows it about quarter size.



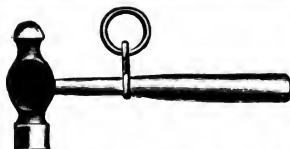
2. We offer as a premium a two line rubber stamp, with your name and address on it, accompanied with an inking pad, making a complete outfit. You will find use for it every day.



3. A handsome and reliable little pocket level like this would be of constant use to you. Nicely finished, $3\frac{1}{2}$ inches long.



4. This Monkey-wrench in spite of being the size shown above, works just like a big wrench. The handle is of bone and the metal parts nickel-plated.



5. This miniature blacksmith hammer is neatly finished, and makes a splendid watch charm. Cut shows it full size.

BOLTS AND RODS

Threaded with the

**Hart "Duplex" Die Stock**

Show a superior grade of work and an economy in cost that argues well for the tool employed.

With the Duplex there is no time wasted running back over long threads—when the end of the thread is reached the dies open handily and the work is released. It is easily set to cut oversize, even as much as 1-32 inch, or under size, and roughing and finishing cuts are readily taken. No wrench or other tool required for changing the dies.

Die Stocks for Bolt or Rod threading are put up in hardwood cases with taps and called Machinists' Sets.

Write us for list of combinations.

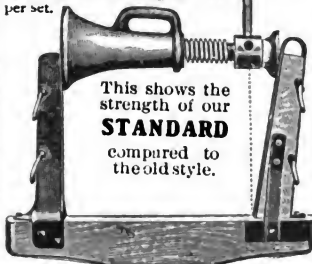
THE HART MFG. COMPANY

50 Wood Street, CLEVELAND, O.

We make the following sizes:

No. 1. 3 in. w.de, 14 in. high
" 2. 3 1/2 " 14 "
" 3. 3 1/2 " 10 "

Price. \$1.65 per set of 4 stks.
Cash with order. Weight, 16 lbs. per set.



This shows the strength of our **STANDARD** compared to the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by no-tise.

3. The Malleable Iron Standard has a 3 1/2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.

Trade, Literature and Notes.

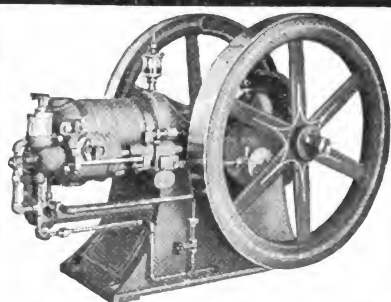
THE BRYDEN HORSESHOE COMPANY of Catsauqua, Pa., whose announcement appears on page VIII. of this issue, call attention to the racing season specialties they are offering to the trade. Horseshoers who have occasion to shoe trotters, pacers, runners or other fast horses, will do well to write for catalogue and price list, both of which will be sent upon request.

LITTLE GIANT bolt cutters and nut tappers, hand and power, are fully described in an illustrated leaflet just issued by Wells Bros. of Greenfield, Mass. Interesting prices on these well known brands are quoted to the trade and if you intend to improve your equipment, send for a copy of this circular.

SEVERAL NEAT FOLDERS have just been received from The "Always Sharp" Calk Mfg. Co., Springfield, Mass., containing strong and interesting testimonials in favor of "Always Sharp" calks. This firm is looking for reliable agents and especially at this season our readers would do well to investigate. Write for particulars.

THE GOODSON IGNITION SYSTEM, it is claimed, dispenses with all batteries, spark coils, high tension wires, belts and friction wheels. The spark is of constant strength whether the engine makes one or 1,000 R. P. M. The sparking points are non-fouling.

The igniters manufactured by the Goodson Electric Ignition Co. of Providence, R. I., are guaranteed to produce a sufficient spark to start a gas or gasoline engine without batteries or spark coil.

**MICHIGAN FIVE HORSE**

A handy, reliable and economical gasoline engine for the blacksmith or machine shop owner. Every part fully illustrated and explained in our catalogue and every engine guaranteed. Ask for our free book, "Proof Positive," showing how the engines are used, and letters from the users. 2, 3 1/2 and 6 Horse Power sizes for light power and farm uses.

The Nation Engineering Co.
SAGINAW MICHIGAN

Blacksmith Agents Wanted

WE PAY LIBERAL CASH COMMISSIONS



We sell an elegant Top Buggy for only \$37.50, on terms of \$10.00 cash, balance payable \$5.00 month; no interest.

We manufacture a complete line of Buggies, Surreys, Spring and Farm Wagons.

We trust honest people located in all parts of the world. Write us for free catalogue and particulars.

Century Mfg. Co.

Dept. A. B.

EAST ST. LOUIS, ILL.

**BE SURE
IT'S THE**



COLUMBUS FORGE & IRON CO.



THAT'S THE ANVIL

"IT RINGS LIKE A BELL"

COLUMBUS, OHIO, U. S. A.

SMITH'S Tire Bolt Wrench



The latest and best on the market. Has positive bolt holder and always in line. Can be used on poles and shafts. If not for sale by your jobber, write

THE BICKNELL MFG. & SUPPLY CO.
Sole Manufacturers
JANESVILLE, WIS.



**THE ADVANCE ENGINE
FOR PROGRESSIVE SMITHS**

No better engine made—a model of perfection, which will stand the most rigid test and be found equal to every shop requirement. Write for our interesting catalogue.

**GEORGE D. POHL MFG. CO. VERNON
NEW YORK**

Less Work and More Money

A GUARANTEE MADE TO USERS OF

The Mundhenk Tire Bolting Machine

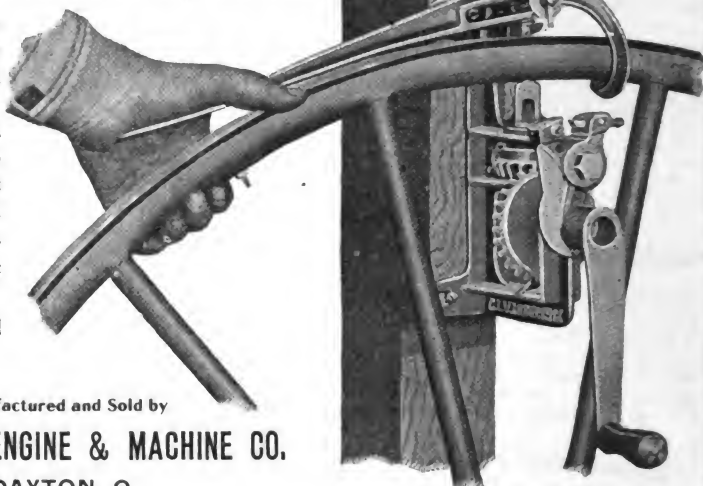
Mundhenk's Tire Bolter is the Only Machine that Will Successfully Remove all Burrs, Run Them On or Clip Ends off Tire Bolt Perfectly Smooth in 2 minutes' time.

Send for one of our interesting circulars and let us tell you all about it.

Manufactured and Sold by

RILEY GAS ENGINE & MACHINE CO.

DAYTON, O.



Easily operated. Made of Malleable Iron. Constructed to fit any size nut. A labor saving machine for up-to-date shops.

Round Pegs in Round Holes

If your products fit into the field covered by The American Blacksmith, we want to carry your announcement.

The American Blacksmith fits into its field as a round peg in the hole made for it. It has gained the confidence of its readers by a carefulness in choosing both its reading and its advertising matter. If your goods are a "square peg" (patent medicine, gold brick or the like), you cannot get into our hole even by using a pile driver. Our people look to us for new methods, new goods, new ideas. They are in business to make money. If you have something to help them, they are eager to know about it, and we can help you reach them. You cannot touch them in any other way.

If your goods are of the "round peg" order, we can show you maximum returns at minimum cost. Twenty-five thousand buyers in the smithing field read The American Blacksmith every month of the year.

The American Blacksmith, Buffalo

"THE BEST IS NONE TOO GOOD"

WE GUARANTEE

OUR

"COLUMBIAN"

ALL-STEEL ANVILS

to be so constructed as to stand the most rigid test of long and severe service.



**SUPERIOR
QUALITY**

**REASONABLE
PRICES**

These anvils are built on scientific lines and have that "true ring" which superior quality alone can produce. Made of special steel, by the most skilled workmen. We not only claim that they are the most durable but place back of each and every anvil a WRITTEN GUARANTEE.

DROP US A POSTAL FOR PRICES AND INTERESTING VISE AND ANVIL CATALOGUE No. 16.

THE COLUMBIAN HARDWARE CO.

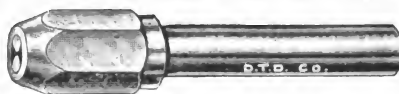
MANUFACTURERS

CLEVELAND, OHIO, U. S. A.

WHY NOT BUY A CHUCK

That will fit the spindle of your drill press, holding drills $\frac{1}{2}$ to $\frac{1}{4}$ in. inclusive, with reducer to $\frac{3}{8}$? Drills held by this chuck are much cheaper than drills with $\frac{1}{2}$ in. or $\frac{3}{4}$ in. shank. Simplest and cheapest chuck on the market.

WRITE FOR CATALOGUE AND PRICES



DETROIT TWIST DRILL CO.
228 21st Street, Detroit, Mich.

"Tools That Wear" HELLERS' CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIERS' TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



HELLER BROS. CO., NEWARK, N. J., U. S. A.

(A Lady can hold him.)



THE BEERY BIT

FOUR BITS IN ONE

Cures Kickers, Shyers, Bolters, Pullers and Runaways.

There are four distinct ways of using it. They sell at sight. Agents make big money selling them. One agent writes: "I am leaving the farm to devote my entire time to the sale of the bit." Send postal for terms to agents.

Prof. W. Beery, Pleasant Hill, Ohio.

A great many Blacksmiths are selling the bits just by showing them to their regular customers at their shops.

LOTS AND LOTS OF BLACKSMITHS

have sent us in one or more new subscribers to the paper. **HAVE YOU?** If not, why not secure one new subscriber to THE AMERICAN BLACKSMITH this month and let us extend your subscription six months as a reward? What do you say?

AMERICAN BLACKSMITH COMPANY
BUFFALO, N. Y.

A COMPLETE LINE OF Carriage Tops

and Trimmings

Seventeen different grades of tops
All good ones.
Prices right.

Ask for No. 5 Catalogue

C. A. HALLIDAY, 24 Cedar St., Oneida, N. Y.



Let Us Send You Our Book.

about good wheels and good wagons that will save you a lot of work and make you a lot of money—the

ELECTRIC STEEL WHEELS

—and the—

ELECTRIC HANDY WAGON.

By every test, they are the best. More than one and a quarter millions sold. Spokes united to the hub. Can't work loose. A set of our wheels will make your old wagon new. Catalogue free.

ELECTRIC WHEEL CO., P. O. Box A Quincy, Ills.



ELECTRIC

Blacksmiths' Tools and Machinery

Wagon Builders' and Horse-shoers' Supplies.

**Everything
Used by the Smith,**

Whether made of Iron, Wood
or Leather.

Manufacturers of

**A. M. W. Whiffletree hooks and
soft or hardwood body makers'
plugs. Write us**

A. M. Wood Company,

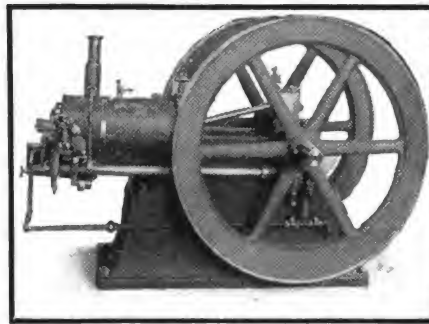
51-53 Beverley Street,
BOSTON, MASS.

RELIABILITY



GUARANTEED

**LEAST
Consumption
of Fuel
OF ANY ENGINE MADE**



5 Horse Power Weber Engine

**A
20th Century
Up to Date
Blacksmith's Engine**

EVERY ENGINE TESTED WITH LOAD BEFORE SHIPPING

2½ to 300 Horse Power

OUR PRICES WILL INTEREST YOU

2½ to 300 Horse Power

WEBER GAS AND GASOLINE ENGINE CO.

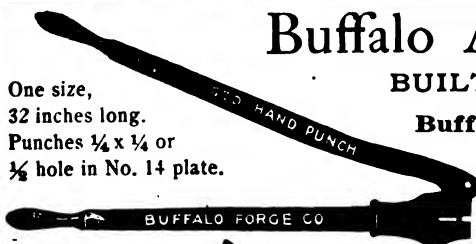
Box V, 1114

KANSAS CITY, MO.

Buffalo Armor Plate Punches and Shears

BUILT FROM ARMOR STEEL AND DROP FORGINGS

One size,
32 inches long.
Punches ¼ x ¼ or
⅜ hole in No. 14 plate.



Buffalo Drop Forged Hand Punch.—A tool newly designed throughout of exceptional value to blacksmiths and wagon builders. Solid drop forged head. Cam action. Removable punches and dies. Works close up to corners. Write for further particulars.

A favorite for
light work.



Buffalo Pygmy
Punch No. 12.

A special catalogue devoted exclusively to Buffalo Punches and Shears is ready for distribution.

Put your name and address on a postal and get in with the wide-awakes.



Buffalo No. 4 Combined
Punch and Shear.
Punches ⅝ x 1½ and shears ⅝ x 3.

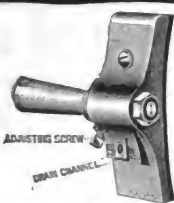


Giant No. 5
Punch and Shear.
Our heavy duty machine punches ¾ x ¾,
shears 6 in. by ¾ in.

BUFFALO FORGE COMPANY

BUFFALO, N. Y.

Manufactured in Canada by the CANADIAN BUFFALO FORGE COMPANY, Ltd., Montreal



Potters Spring Brake Blocks

For Vehicles of all kinds with STEEL OR RUBBER TIRE.
Have a record of excellency for seventeen years. **• • •**

The MORGAN POTTER CO.

SOLE MANUFACTURERS.

CATALOGUES.

FISHKILL ON HUDSON, N. Y.

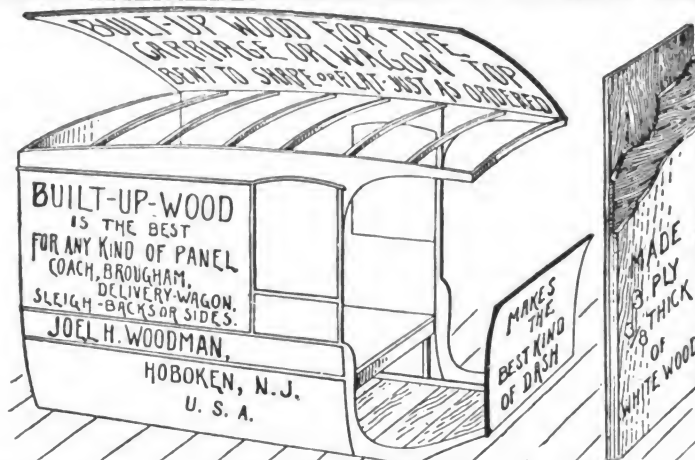


Across
Lake Erie
Between
Twilight
and
Dawn

THE D. & B. Line Steamers Leave Detroit daily at 5:00 p. m. (central time) and Buffalo daily at 5:30 p. m. (eastern time), reaching their destination the next morning after a cool, comfortable night's rest en route. By special arrangement all classes of tickets reading via the Michigan Central, Wabash and Grand Trunk Railways, between Detroit and Buffalo, in either direction, are optional and will be accepted for transportation on the D. & B. Line.

**Detroit & Buffalo
Steamboat Co.**

A. A. SCHANTZ,
Gen'l Supt. & Pass. Traf. Mgr.
Detroit, Mich.



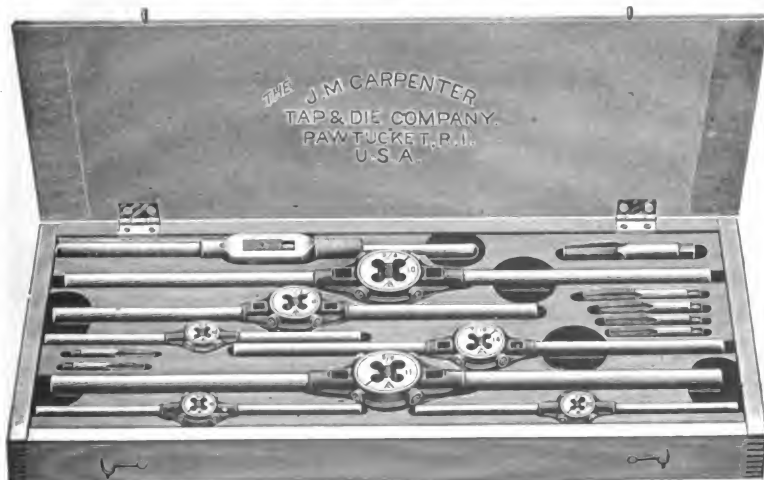
The Modern Power Hammer

is what the name implies—
up-to-date in every respect.

Ask your dealer or write
to us for prices and easy
terms.

Grinnell Mfg. Co.

GRINNELL, IOWA.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see
Carpenter's and you will have no other make.

Send for catalogue

The J. M. Carpenter Tap & Die Co.

Pawtucket, R. I., U. S. A.

Two Good Works on Horseshoeing

A Text Book on Horseshoeing, by A. Lungwitz. A complete treatise on anatomy, shoeing, bad feet, interfering, etc. Cloth bound, 168 pages, 141 illustrations..... **\$2.00**
 Wagner's A B C Guide to sensible horseshoeing. Cloth bound, 130 pages, 400 illustrations..... **1.00**
 Sent postpaid on receipt of price.

IT TELLS YOU HOW TO PAINT Carriages, Wagons and Sleighs. Gives full directions for all kinds of work. Full of good receipts and useful hints.

Practical Carriage and Wagon Painting—A new enlarged edition of a standard book by M. C. Hillick, price, postpaid..... **\$1.00**

AMERICAN BLACKSMITH CO., Box 974, Buffalo, N. Y.

THE Little Giant

Combined Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

This is not a new machine—only a new cut showing the improvements we have lately added—making it more valuable for the blacksmith. It is made in three sizes. No. 1 will punch $\frac{3}{4}$ in. hole in $\frac{1}{2}$ in. iron; cuts iron $\frac{3}{4}$ in. thick and 1 inch round. Weight, 500 lbs. No. 2 will punch $\frac{1}{2}$ in. hole in $\frac{1}{2}$ in. iron, cuts iron $\frac{1}{2}$ in. thick and $\frac{3}{4}$ in. round. Weight, 350 lbs. No. 3 will punch $\frac{1}{2}$ in. hole in $\frac{3}{4}$ in. iron, cuts iron $\frac{3}{4}$ in. thick and $\frac{3}{4}$ in. round. Weight 275 lbs. Each machine is equipped with five sets of punches and dies. This machine is made for the blacksmith shop and we DO claim that it is decidedly the best on the market for that place, and can furnish any amount of testimonials to that effect.



For Sale by your Jobber. If Not, Write Us. Send for Circular.

LITTLE GIANT PUNCH & SHEAR CO., Sparta, Ill.

CONTRACTED



Every blacksmith knows how troublesome contracted feet are; how they get blamed for this fault when the cause is really the owner's.

Here is a way to overcome both the trouble and the blame, and at the same time make a good many extra dollars in a year besides adding a good many new customers to your shop.

Get acquainted with O. K. HOOF REMEDY—the quickest, surest hoof remedy you ever saw. Send to us for a trial can and test it for your own satisfaction. It is not only fine for Contracted Feet, but Corns, Dry, Cracked and Brittle Hoofs, Quarter Cracks, Thrush, and for nail pricks it is especially good. If applied promptly it will absolutely prevent lock-jaw.

If it does this, and it does, wouldn't you like to handle it and get the liberal profit we allow our blacksmith agents?

Wouldn't you like to pick up these extra dollars that can be earned so easy, besides it will bring you new trade who will hear of the good work O. K. HOOF REMEDY does?

Walter L. Long, horse-shoer. Blue Island, Ill. says:—
 "It certainly does all you say it will. Grows hoofs quicker and keeps them in better condition than any other remedy."

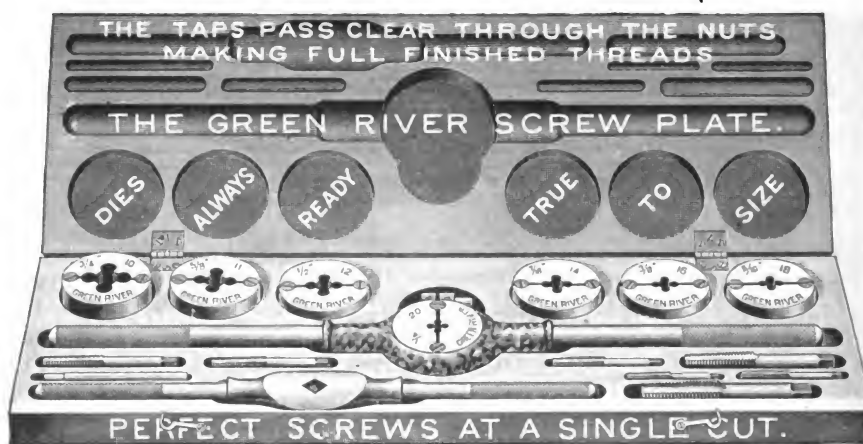
It has grown entire new hoofs in nine months' time. Remember it is a remedy so good you can sell it on a money-back guarantee if it fails. We want you to handle it in your town. Write for terms. THE O. K. STOCK FOOD CO., 450 MONROE BUILDING, CHICAGO, ILLINOIS.

GREEN RIVER SCREW PLATES

Material and Finish the Finest

Handy,
Strong,
Durable.

Cut
Perfect
Threads.



Write for
Catalog
and
Prices.

Ask your
Dealer
for them.

MADE BY

WILEY AND RUSSELL MFG. CO. GREENFIELD, MASS., U. S. A.



EACH ONE GUARANTEED.

BOLT CLIPPERS

CHAMBERS BROS. CO.,
N. Fifty-Second Street,
Philadelphia, Pa.



STEEL STAMPS
Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, etc.

Geo. M. Ness, Jr.,
61 Fulton St., N. Y.

Price list sent upon application.



New Era Electric BLOWER

Direct connected, has been designed especially for the blacksmith, and it is his ever ready helper that works for less than five cents a day, and never tires. It places him on an equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

NEW ERA ELECTRIC CO.

Write for circular and particulars.



942 W. Lake St. CHICAGO.



CASH

Always Secures BARGAINS and ALWAYS WILL
Special Net Price on Sarven Patent Wheels (C. B. soc. extra) with steel and rubber tire



Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored			Add to price of wheels for axles and boxes set
		36 and 40	38 and 40	40 and 44	
3/4	\$5.75	\$13.50	\$14.00	\$14.50	\$1.90 L.D.
1 1/8	5.85	14.50	15.00	15.50	1.90 "
1 1/4	6.10	16.00	16.75	17.50	2.10 "
1 1/2	8.25	24.00	25.00	26.00	2.25 H.P.

Both wheels and rubber guaranteed. Repair Wheels, \$3.50. PROMPT SHIPMENTS. Five set or more, one order, you can deduct 25c. per set as freight allowance. Write for catalogue. We manufacture wheels with Steel or Rubber Tire on, 3-4 to 4 inch tread. Buggy Gears, with wheels and shaft all ready for body, \$16.05 delivered.
The A. Boob Wheel Co., Cincinnati, O., U. S. A

ALLEN-RANDALL BOLT CLIPPER



ALLEN-RANDALL CO., Springfield, Mass.

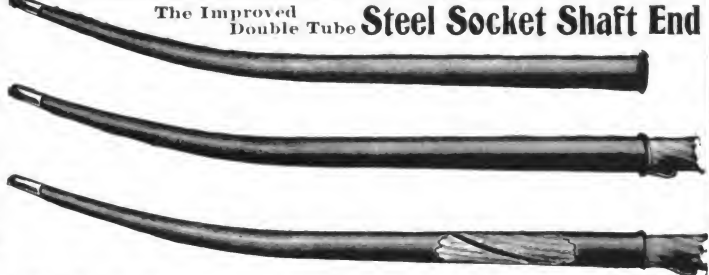
We are the original manufacturers of

Shaft Ends

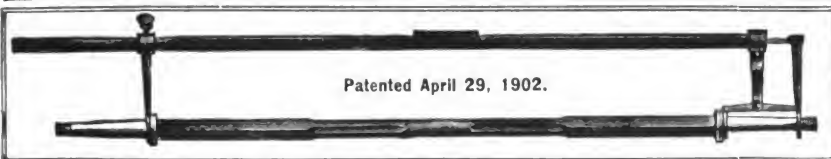
Patented.

When buying why not get the best—always specify for our **Spliced Joint**. If your jobber cannot supply you, write us.

BEWARE OF IMITATIONS. CUT SHOWING SPLICE JOINT.
STEEL SOCKET SHAFT END CO., Cleveland, Ohio, U.S.A.



The Improved Double Tube Steel Socket Shaft End



Patented April 29, 1902.

FREE ON 30 DAYS' TRIAL

No shop complete without it. Send for one today and be convinced that **THE REYNOLDS AXLE GAUGE** exceeds all others in simplicity of adjustment and accuracy of gauge. Ask your dealer for this gauge, and if he cannot supply you, write to us direct. Upon request, we will send free descriptive circulars and interesting pricelist. **WRITE TODAY.**

E. T. BUHL MFG. CO., CLEVELAND, OHIO, DEPARTMENT A.

YOU JUDGE

Invest in some good books and then judge for yourself if it doesn't pay. Their pages tell you how to do many a difficult job. You cannot afford to be without these:

Forge Practice.

A most valuable treatise upon forge work by John L. Bacon. The book is profusely illustrated and contains chapters on welding, upsetting, drawing out, bending, metalurgy and calculation of stock, also tables and formulas. It has over 250 pages and is very neatly bound in red cloth. **Price, \$1.50**

Modern Blacksmithing

is a well illustrated book on general smithing by J. G. Holmstrom, a practical smith. It tells how to make but her knives, hammers, chisels, plowshares, wrenches, etc. Contains chapters on case hardening, babbiting, drilling and welding. Contains over 200 pages and is handsomely bound in half-leather. **Price, \$1.00**

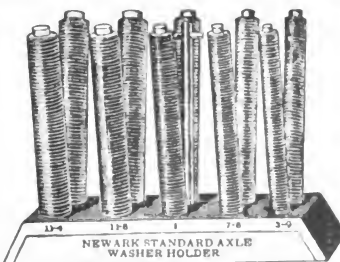
Practical Carriage and Wagon Painting.

A very complete treatise on the painting of vehicles by M. C. Hillick, a master in the art of vehicle painting. The book is just filled with sound, practical information. Fully illustrated and bound in red silk, library cloth. Contains over 150 pages. **Price, \$1.00**

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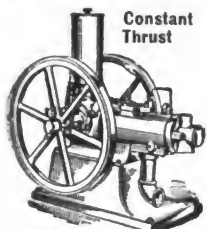
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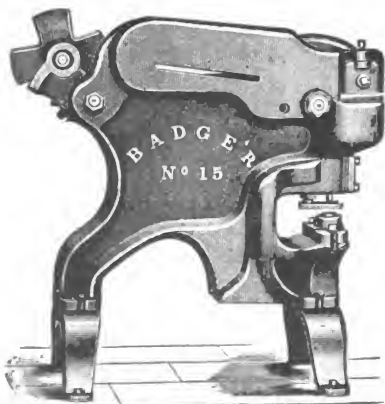
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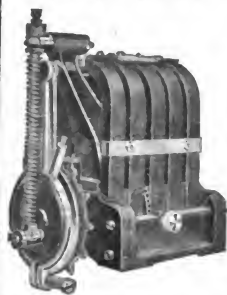
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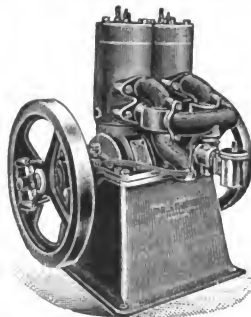


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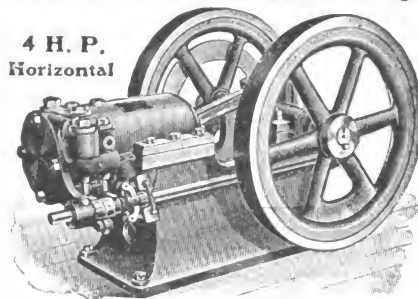
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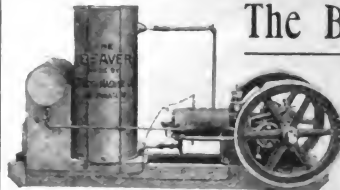


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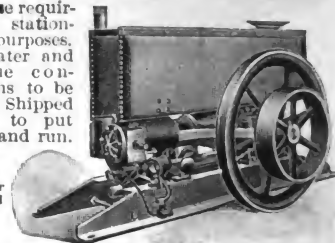
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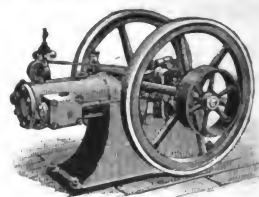
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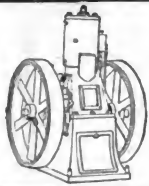
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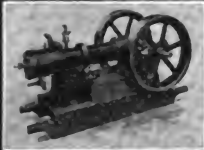
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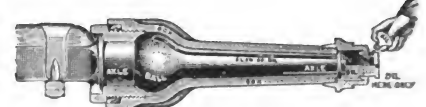
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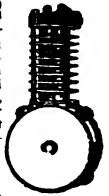


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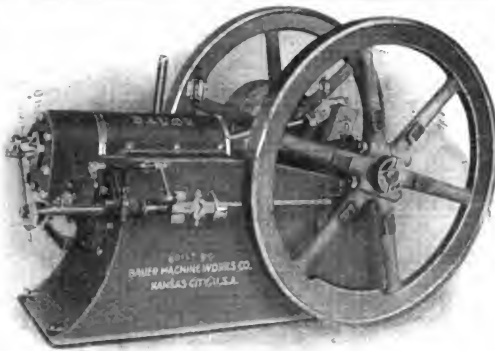
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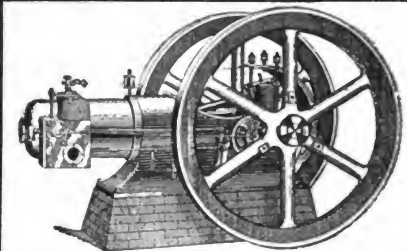
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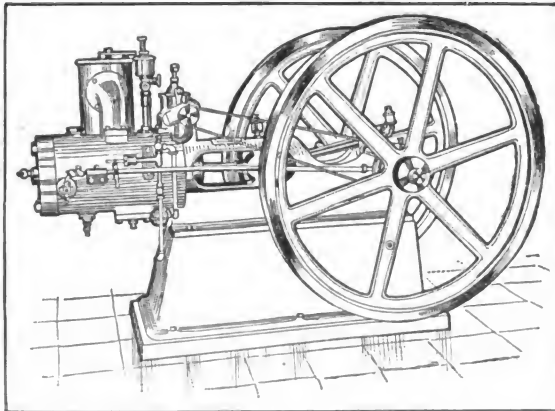
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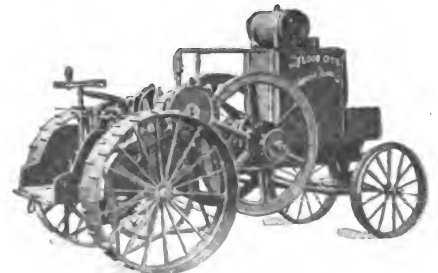
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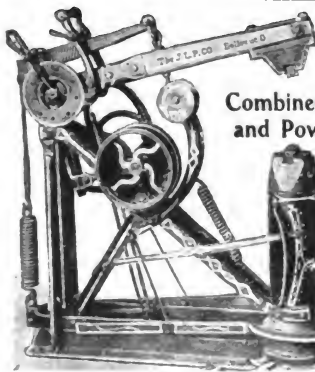
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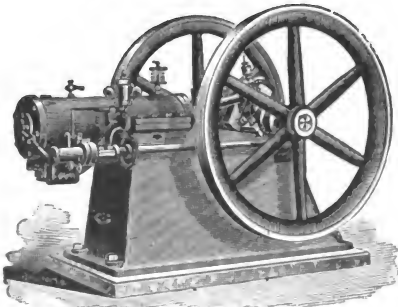
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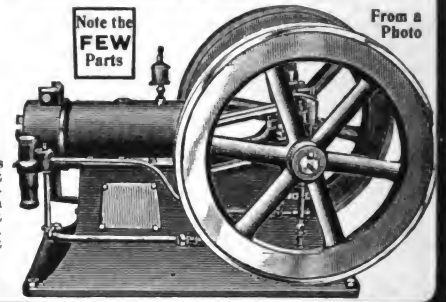
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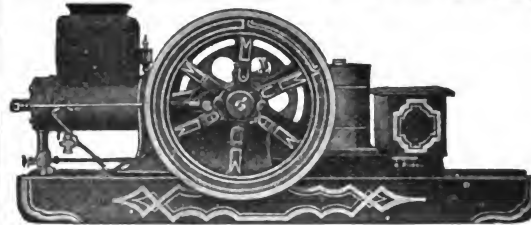
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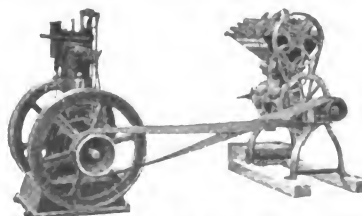
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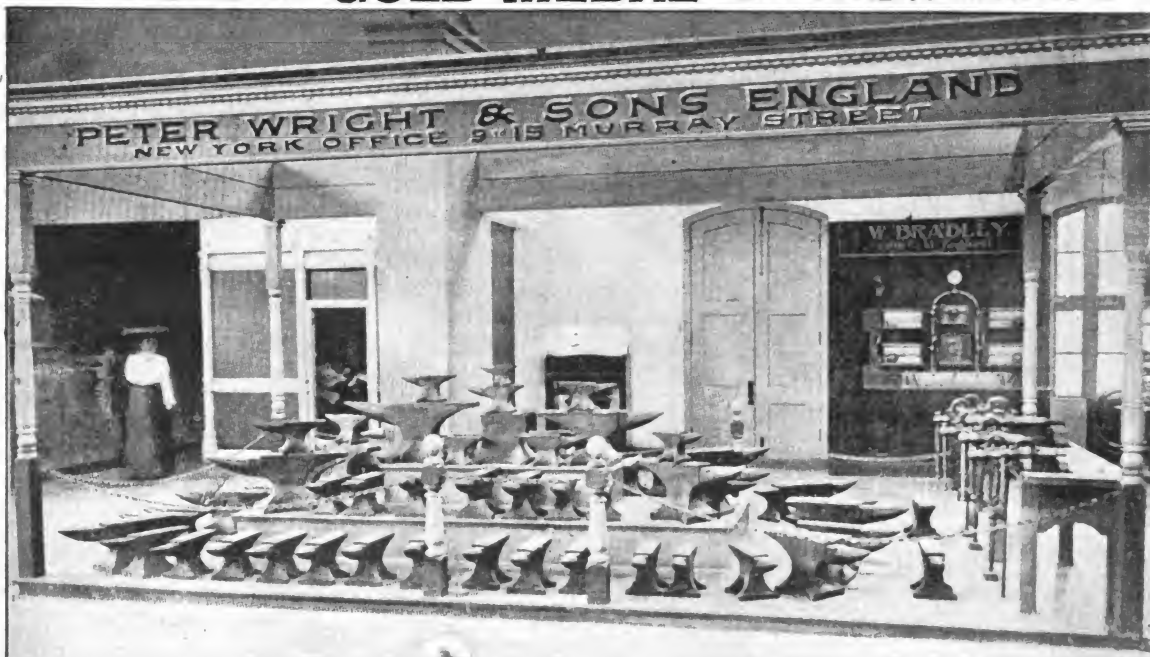
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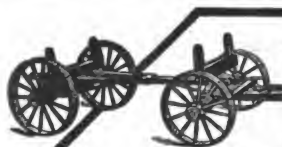
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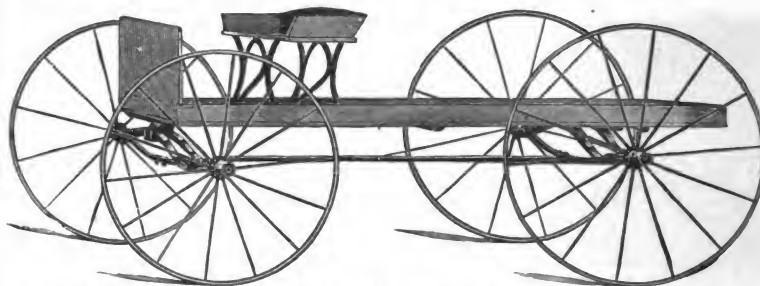
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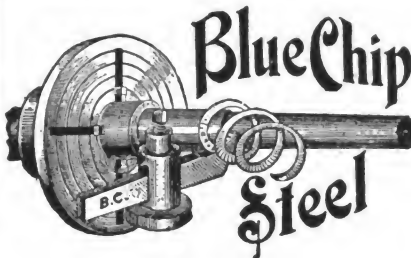
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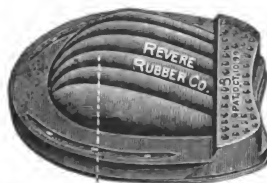
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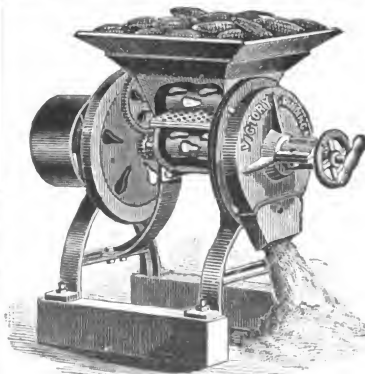
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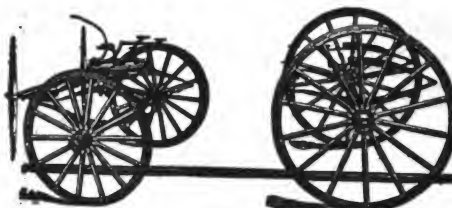


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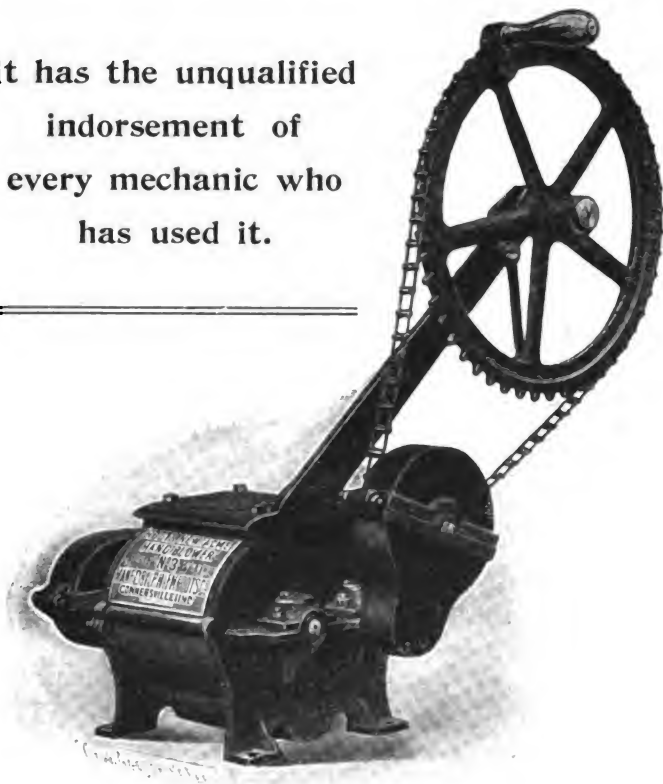
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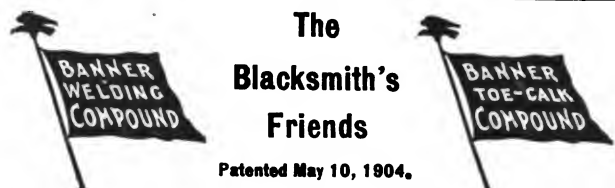
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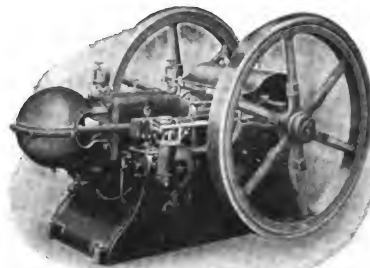
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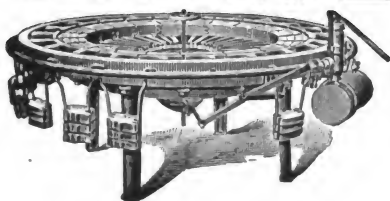


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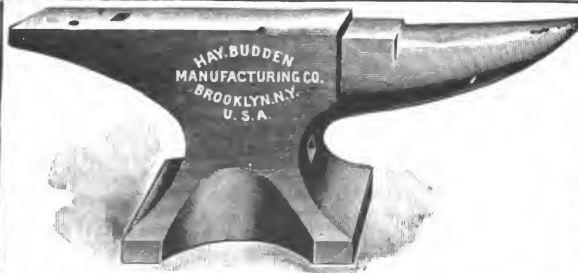
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